American MILK REVIEW

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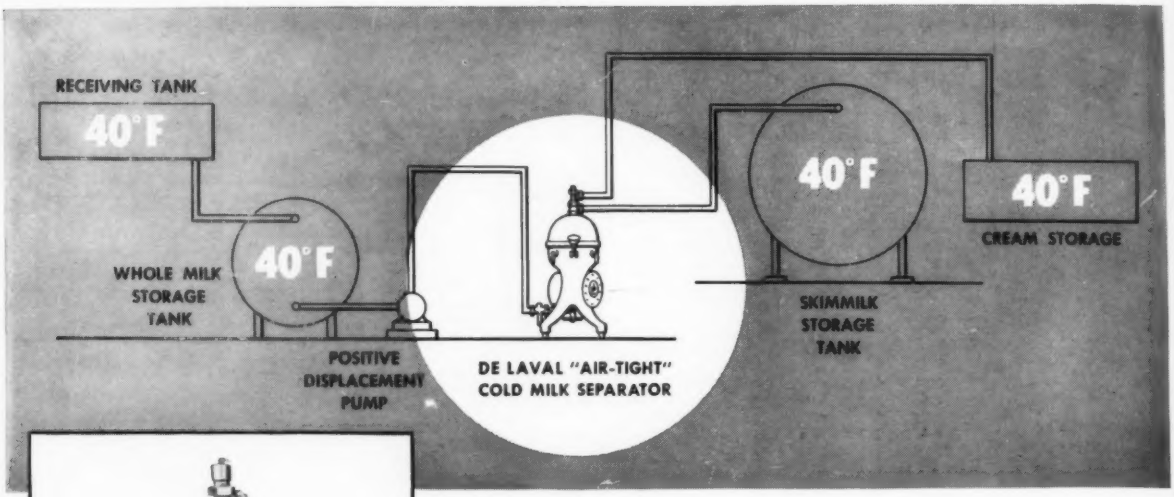
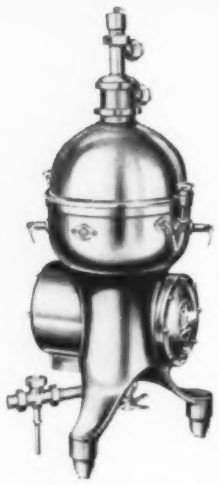
De Laval *"AIR-TIGHT"*
COLD MILK SEPARATORS
Save Heating...Cooling...and Operating Costs





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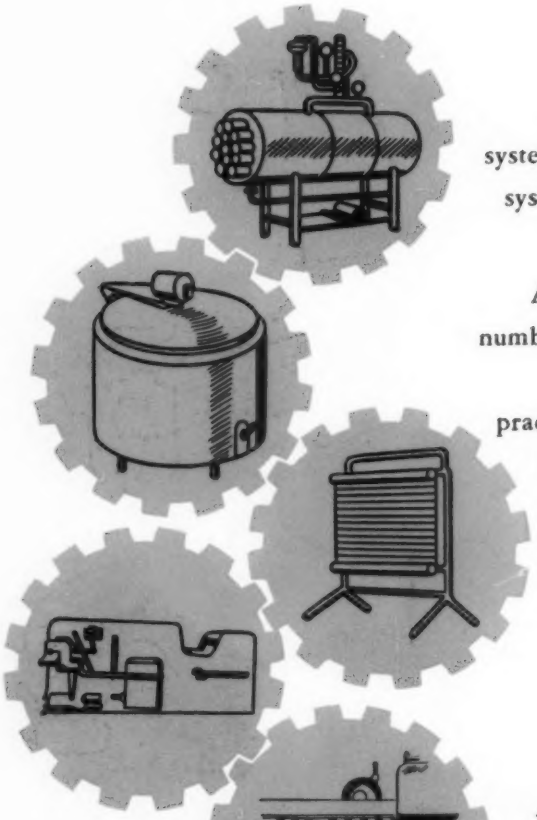

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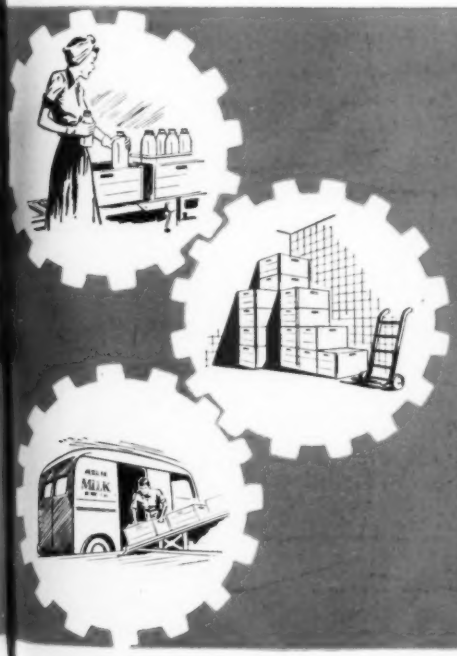

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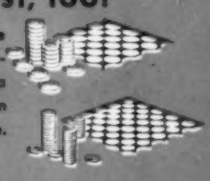

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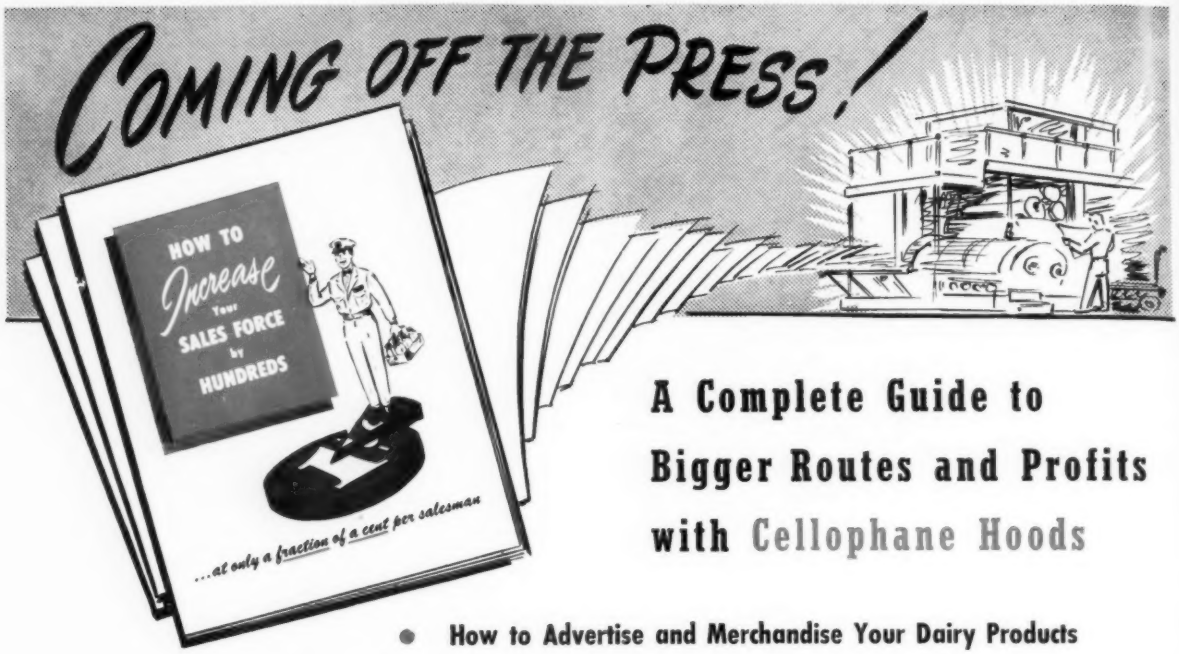

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VOLUME 11 - - OCTOBER 1949 - - NUMBER 10

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Foreword

THIS ISSUE of the American Milk Review is devoted primarily to the subject of instrumentation in dairy plants. When we entered upon this project we had a nodding acquaintance with instruments, as much so as most dairymen have. We looked with respect on those panels with their pointers and their "clocks" and their deep, almost mysterious suggestion of the scientific. But as we visited the plants where instruments are manufactured, as we talked with instrument men we entered upon a bewildering world of Bourdon springs and capillary tubes, of thermocouples and electronics, of recorders and indicators and controllers. Our purpose was to give dairymen some appreciation of this vast industry that stands behind every unit that leaves the milk plant. We wanted to wrap it up in a neat package and say "Here, gentlemen, is the instrument industry."

At first we were baffled. We went to the factories. We saw men and women working at neat benches soldering, assembling, inscribing. We saw people looking at dials, looking at gauges, looking at scales testing, calibrating, adjusting. But the story eluded us. The heart, the soul of the instrumentation industry was what we were after and we couldn't reach it.

It came to us gradually, almost grudgingly. It was a thrilling thing, a proud thing that we finally understood. We had been looking for something learnedly scientific, something spectacular and all inclusive like Einstein's E equals MC^2. But the real thing was not spectacular. The real thing was simple and terrific. The heart of the instrumentation industry is accuracy and its soul is integrity.

We have assembled on the pages that follow a brief story of this industry, so important to the dairy business. We have tried to take instrumentation apart and show you what makes it tick. We have tried to give you a picture of what instrumentation is along with some practical suggestions on maintenance and operation. But beyond these considerations we have tried to show the fundamental concepts of accurate measurement and accurate control. A thing is right when it is right. It is accurate when it is accurate. Behind the thermocouples and the Bourdon springs loom the human values of high craftsmanship and individual integrity without which all else is of no consequence.

— The Editor.

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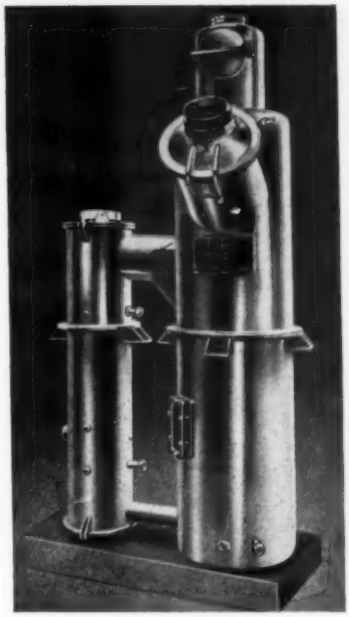

In Small Plants

The Buflovak Single Effect Stainless Steel Evaporator is designed for the plant where limited quantities of milk are concentrated. Uniform heat distribution gives you a large capacity, while sterile operating conditions and rapid evaporation result in an incomparable finished product. Continuous or batch operation is provided.

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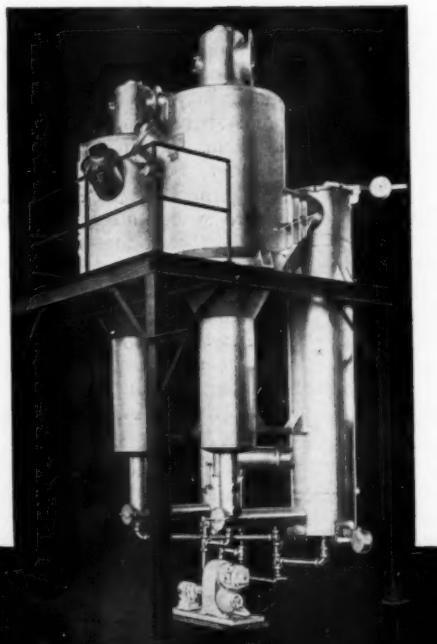

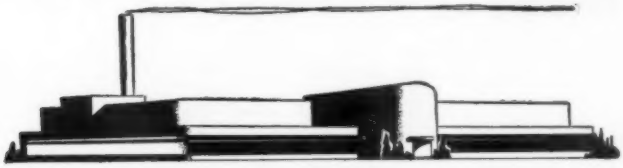

In Large Plants

Where large quantities of milk are evaporated, Buflovak Multiple Effect Evaporators offer substantial operating economies in steam and cooling water consumption. The Buflovak Double Effect cuts water and steam costs by 50%. In a Triple Effect installation equipped with a vapor heater* savings in steam reach 67%; in cooling water, 80%. These savings are in comparison to single effect operation. Because Buflovak Evaporators must meet our rigid, self-imposed standards, all equipment is assembled and thoroughly tested before shipment.

*Vapor Milk Heaters can be furnished with new equipment or can be fitted into existing installations.

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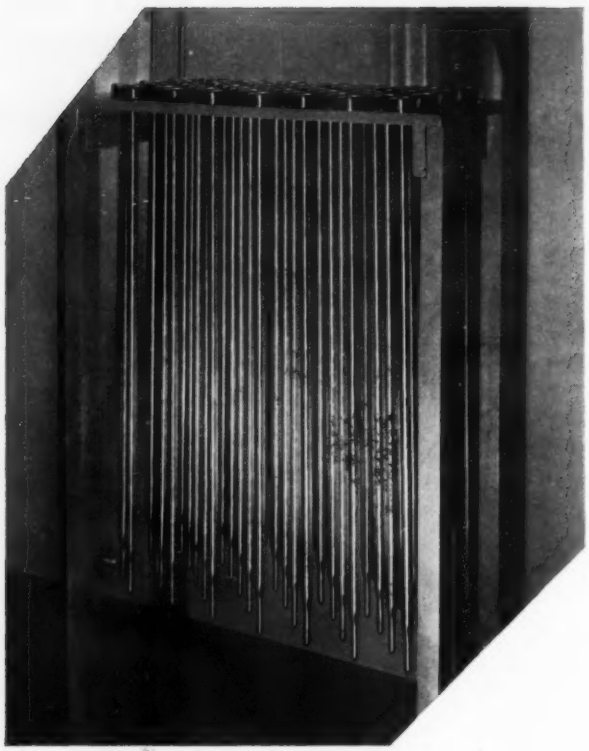


Their flawless surfaces playing with light and shadow these thermometer stems have been buffed and polished and are ready to have the glass thermometers and cases installed.

Temperature and Pressure Instruments In The Dairy Industry

By ADDISON LEBOUTILLIER

Taylor Instrument Co.

PROMINENT on the long list of responsibilities of a Dairy Operator is the task of maintaining equipment in efficient operating condition. By no means the least difficult to understand is the temperature and pressure instrument which so often is an integral part of a processing unit. Certain basic ideas are combined to make the control instrument what it is. A knowledge of these will help us to cope with maintenance problems.

The measuring system which is a part of every instrument is of major importance. Temperature measurement being of great significance in the processing of most dairy products, it will be given first consideration.

We all know that a glass stem thermometer is filled with liquid which expands when heat is applied to the bulb, raising the level in the stem to give a temperature reading. This same principle may be applied using a metal bulb, and for the stem, a flexible tube of small inside diameter called a capillary. The upper end of the capillary is joined to what is termed a spring. The spring is formed of flattened metal tubing of elastic quality rolled into a coil. The inner end joins the capillary and outer end is sealed. This entire assemblage is known as a thermal system. If mercury is used in the thermal system and fills bulb, capillary, and spring completely, heat applied to the bulb will cause the spring to uncoil slightly as the expanding mercury flows away from the bulb. This motion of the spring is all that is needed to give us a temperature reading. A lever is fastened to the free end of the spring and is connected by a system of linkages which move a pen or spring movement is sufficient to provide full scale or chart travel of the pen or indicator.

Certain refinements of this design are necessary to assure the proper accuracy. The tension in the spring must be great enough so that linkage friction and pen drag will not effect a temperature reading. Also, false pen or indicator readings may be caused by variations in temperature at the spring or along the capillary if these parts are not temperature compensated.

Vapor Actuated System

A variation of the mercury system is the vapor actuated system. It differs in that a highly volatile filling liquid such as ether is used which fills only part of the bulb. The remaining space in the capillary, spring, and above the liquid is devoid of air and becomes filled with the vapor of the fill. Temperature changes at the bulb cause vapor pressure changes which move the spring. Similiarly, if temperatures are higher at the spring or along the capillary than at the bulb, the vapor pressure would be higher than at the bulb and would therefore cause the pen or indicator to read erroneously. To overcome this, the system is double filled. The bulb is filled with the volatile liquid while the spring and capillary are filled with a liquid unaffected by temperature changes and which will not mix with the volatile liquid. Vapor pressures at the bulb are transmitted to the spring by this non-miscible liquid.

Other types of system less frequently encountered in the dairy industry are filled with gas or organic liquid.

Each type of system has its inherent characteristics which makes it best suited for certain purposes. Mercury systems are calibrated to a uniformly graduated scale but may be slower in response than vapor systems. Vapor actuated systems lend themselves to high response rate applications but must be calibrated to a non-uniform chart or scale. The divisions are spaced much more closely together at the bottom than at the top. This may be of advantage in applications such as pasteurizing where the user is mainly concerned with a single temperature. A system may be selected with the desired temperature near the upper end of the range, giving much greater accuracy at that point than a uniformly graduated scale.

Speed of response is an important consideration in the construction of a tube system for the dairy industry, therefore, standards of measurement have been devised which are the basis for comparison of one system to another. If the bulb were taken from a low temperature bath and plunged into one of higher temperature one might expect to time the period necessary for the pen or

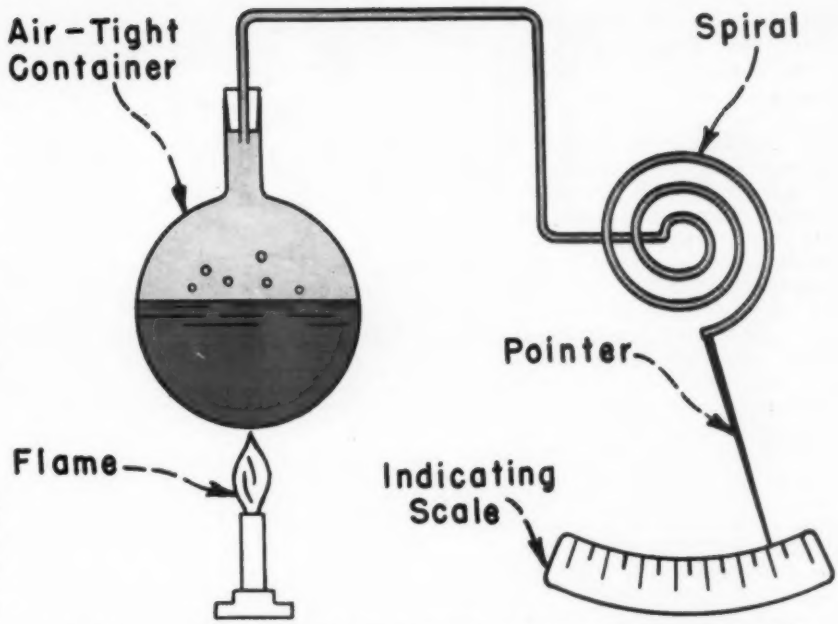
indicator to reach the higher temperature reading. However, the pen or indicator will move rapidly at first then progressively slower as it approaches the higher temperature reading making it difficult to estimate exactly when the higher temperature has been reached. This difficulty is overcome by one established criteria which requires the timing period be taken from the instant the bulb is plunged into the higher temperature bath until a temperature indication is reached which is 63% between high and low values. For a short time pasteurizing unit, a vapor system may be designed with a 63% response rate of less than two seconds.

Common Nature of Systems

Knowing the principle by which the tube system operates, it is not surprising to realize that pressure measuring systems are very similiar. Most common pressure measuring element is the Bourdon tube which is a crescent shaped tube with the pressure measuring connection at one end and the opposite end sealed. Pressure changes cause a flexing of the tube which move a pen or indicator through a linkage connected at the sealed end.

Another form of pressure measuring element particularly adaptable to high pressure measurement such as homogenizers is the volumetric system. It resembles the solid filled thermal system very closely, the only variation being that the bulb is pressure rather than temperature sensitive. Since temperature changes would produce errors in pressure readings, bulb, capillary, and spring must be designed to be unaffected by such variations.

The means of measuring a variable quantity established, we may turn our attention to the mechanism necessary to control this variable. Most of us have contended with a home heating plant. Using it as an example, we may more readily understand forms of control response encountered. The simplest of these is termed on-off and is typified by the furnace operator who opens his draft wide when the house temperature drops below what he wishes it to be and closes it when the temperature is at or above what he wishes it to be. If a graph were drawn of the resulting house temperature, we would find that the line would resemble the contour of an old fashioned washboard. There are many applications where this form of control is all that is necessary. However, many others require proportional response. Using the home furnace operator as an example again, this may be explained if he positioned his draft proportional to the deviation of the house temperature from the control point. At 70° F, it would be half open and at 71° F, 0.4 open. For every degree the house temperature changed between 65° F and 75° F, the draft moves 0.1 of its travel. The resulting graphic control line would start to assume the appearance of the wash board but the oscillations would gradually diminish until a straight line formed. The operator might initiate a change in sensitivity by moving the draft from full open to full closed over the span of 5° F. For each degree of temperature change between 67½° F and 72½° F, the draft would be moved 0.2 of its travel. As sensitivity is increased, we approach an on-off control.



A simple thermal system. This one is vapor actuated. A highly volatile liquid such as ether partially fills the air-tight container. As heat is applied to the liquid it gives off vapor which fills the tube or capillary and the spring. As the pressure of the vapor increases the spiral tends to unwind causing the pointer to move.

Automatic Reset

Applications with instruments operating in too high sensitivity produce an oscillating control line which will not settle into a straight line. Too low sensitivity produces a control line which wanders from the control point without congruity. Using the household heating analogy once more, we may see how the occasion may arise when proportional response alone does not give completely satisfactory control. On the particular day that the operator controlled his furnace with proportional response, his draft was always 0.5 open when the temperature coincided with the control point of 70° F. If the following day were colder, his furnace must deliver more heat to maintain 70° F, therefore the draft opening of 0.5 would be insufficient. Continuing to operate on the previous day's schedule, his house temperature would drop to some value below 70° F and remain there with the draft open slightly over 0.5 of its travel. To bring this temperature back to 70° F he must seek a new position of the draft. The response which does this for him is known as automatic reset. It gives a continuing correction whose rate is proportional to the deviation of the indicated temperature from the control point. The terms of expression are repeats per minute. In executing this response, the operator would open his draft at a uniform rate until the temperature returned to the control point. If the sensitivity were such that the draft was moved 0.1 of its travel per degree deviation of the indicated temperature from the control point and the operator selected a reset rate of 1 repeats per minute, he would execute this by gradually opening the draft 0.1 more of its travel during the first minute the indicated temperature remained 1° F below the control point. If the indicated temperature remained 2° F below the control point for one minute, he would, at the end of this time move the draft 0.2 of its travel. At the end of the second minute, he would have opened it 0.4 more of its travel from the moment he began to apply reset. A reset rate of 2 repeats per minute with this same sensitivity would require him to move the draft 0.2 more travel during the first minute the indicated temperature remained 1° F below the control point. Had the indicated temperature been 2° F below the control point, he would have moved the draft 0.4 more travel during this time. At the end of the sec-

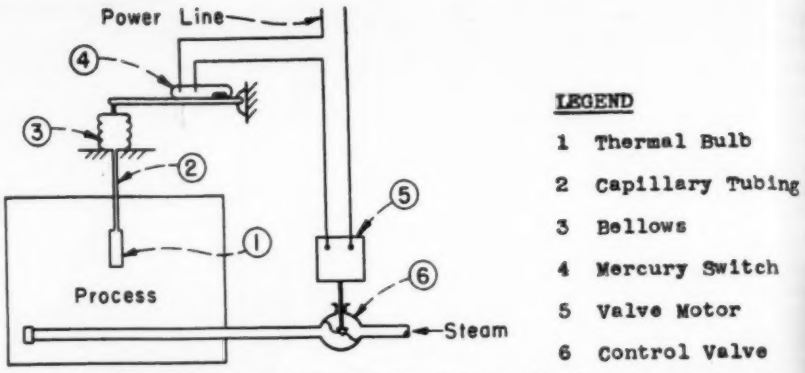
ond minute it would have moved a total of 0.8 more of its travel.

The instruments in which these responses are used operate with an air supply pressure of 20 pounds per square inch and throttle this pressure to give the responses. The final control element which is moved by this throttled air pressure is generally a diaphragm operated valve. Control pressure applied to the diaphragm is opposed by the spring compression, therefore, the position of the valve is determined by the pressure applied to the diaphragm and follows the control responses of the instrument. Where complicated control responses are required, an effort is made to design the valve so that the quantity of flowing medium is proportional to the valve position and therefore follows the control responses of the instrument. In terms of the furnace draft this means that it would be constructed to increase the quantity of air by 10% if the draft opened 10% more of its travel. The simplest valve of this design is known as the V-port and is constructed with skirts on the disc which are notched to permit the flowing medium to pass at a rate somewhat proportional to the stem travel. More expensive valves with this design feature are called ratio and throttle plug valves. The most simple type to build is the beveled disc valve which does not have these flow lift characteristics beyond a short part of the stem travel.

Another type of control not yet mentioned derives the energy to move a valve directly from the tube system. It is known as the self-acting regulator. It has a vapor filled thermal system with a large bellows replacing the spring. The vapor pressure generated by changing temperatures at the bulb is powerful enough for the bellows to move a valve. The uses of the self-acting regulator are limited since it is built with a fixed sensitivity, but, it is important because no outside source of energy is necessary to operate it.

STHT Instrumentation

Let us turn to the dairy equipment in which these instruments are applied. The short time pasteurizer is logically best to consider since it is universally known and is fully instrumentized. The controls may be broken into two parts for consideration, those applied to the water side and those applied to the milk side. The water temperature control may be a proportional response instrument with bulb located a short distance downstream of the circulating pump. Its output pressure throttles a valve admitting steam upstream of the pump. The sensitivity of the instrument is governed largely by the volume of water and its velocity of flow through the system. High velocity and large volumes of water permit the use of high sensitivity. Such

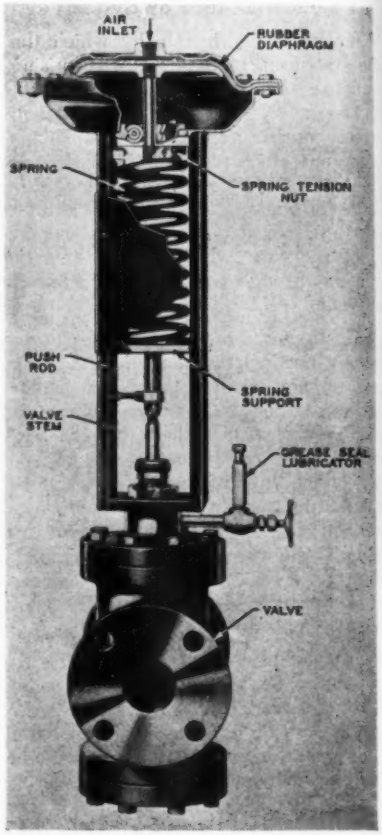


The self acting regulator has a vapor filled thermal system. Changing vapor pressures acting through the capillary on the bellows move the valve which controls the operation.

factors as steam pressure upstream of the control valve and changing raw milk temperatures make the use of automatic reset desirable.

The instruments applied to the milk side, are the Safety Thermal Limit Recorder Control and the Flow Diversion Valve. The former of these measures temperatures at the outlet of the holder tube and works in conjunction with the latter to perform two major functions which preclude the possibility of milk passing the forward flow port of the Flow Diversion Valve when not above the legal temperature. First milk which has not reached legal pasteurizing temperature is returned to the raw milk surge tank, second, if the Flow Diversion Valve fails to function when the Safety Thermal Limit Recorder indicates that the milk temperature is sublegal, the milk pump is automatically stopped.

A description of these two elements will help us to understand how this is done. The Safety Thermal Limit Recorder is an electrical On-off controller which contains within its case two electrical relays. The Flow Diversion Valve is a double seated valve, diaphragm operated, which closes the diverted flow port in the inflated position and closes the forward flow port in the deflated position. It contains a solenoid operated air switch which transposes an electrical impulse into a pneumatic impulse applied to the diaphragm. Mounted near the valve stem is a limit switch which is closed when the valve is in forward flow position. Above legal temperatures, the Safety Thermal Limit Recorder is in the "on" position and one of the two electrical relays is thus energized. This relay operates the solenoid on the Flow Diversion Valve and air is delivered to the diaphragm to put the valve in the forward flow position. The limit switch is then closed and in turn energizes the second relay in the Safety Thermal Limit Recorder case. The milk pump is wired into these two relays in



A diaphram operated valve is actuated by control pressure applied to the diaphragm which is opposed by spring compression. The position of the valve is determined by the pressure applied to the diaphragm.

such a way that it will not run unless both are in the energized or de-energized position. Failure of the Flow Diversion Valve to operate results in energizing only one relay therefore, the milk pump will not run. To further safeguard against human oversight, the limit switch can not be closed if the stem locking key is not in place or the plug properly installed. In the event of electricity failure, or loss of air pressure, the Flow

(Please turn to Page 55)

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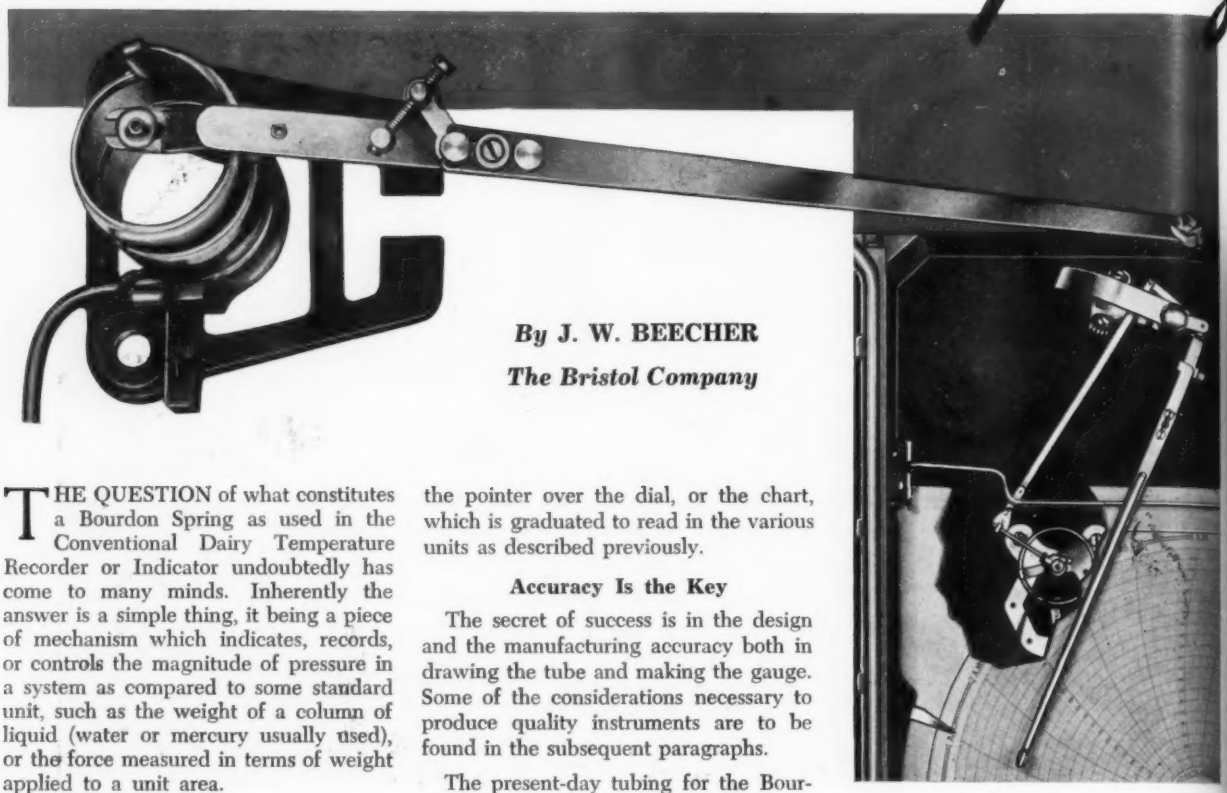
Bourdon Pressure Spring



By **J. W. BEECHER**

The Bristol Company

THE QUESTION of what constitutes a Bourdon Spring as used in the Conventional Dairy Temperature Recorder or Indicator undoubtedly has come to many minds. Inherently the answer is a simple thing, it being a piece of mechanism which indicates, records, or controls the magnitude of pressure in a system as compared to some standard unit, such as the weight of a column of liquid (water or mercury usually used), or the force measured in terms of weight applied to a unit area.

The need for such a device was foreseen by three men, Eugene Bourdon, Lucien Vidie, and Herr Schinz all of whom claimed priority according to historical data. Indeed, it would be interesting to compare the calibration accuracy and life of the gauges of these three pioneers to present-day production items which are backed by laboratory research and the manufacturing advances of modern industry.

Going one step further and asking what makes these ingenious little devices work is a bit more difficult to answer without becoming the author of a text book.

This article is to deal with the most common design, disclosed by the three gentlemen aforementioned, known as the Bourdon type element.

A thin walled tube of oval or flat cross section is coiled and one end sealed off. The other end is exposed to the varying pressure of the application. As the pressure increases the tube spring inflates and uncoils. This movement is used to drive the pointer over the dial, or the chart, which is graduated to read in the various units as described previously.

Accuracy Is the Key

The secret of success is in the design and the manufacturing accuracy both in drawing the tube and making the gauge. Some of the considerations necessary to produce quality instruments are to be found in the subsequent paragraphs.

The present-day tubing for the Bourdon type pressure springs is seamless drawn, or made by accurately drilling rods, and then flattening. All of this is done to the instrument makers specification which is based on the sensitivity, maximum measured pressure and torque required for the application.

The tubing material is very carefully controlled, from the melt to the shipping room in the tube mill, in order to hold vital factors within tolerance. A few of these are chemical composition, tensile strength, elongation, grain size, anneals, season cracking, and concentricity of the inside and outside circumferences of the tubing while in round form. Reasonable control of this last factor is particularly important from a calibration standpoint.

Engineers and inspectors make checks of the material at each step to assure this control. A slip on any of these factors will result in tubing that is below the high standard set for this material. Two of the common faults that are found from lack of control during tubing production, and later pressure spring fabrication, are a tendency for the pressure spring to stretch continuously under pressure causing a high reading that cannot be corrected by recalibration or else a metal fatigue which usually results in a ruptured pressure spring.

A close up of the Bourdon Pressure Spring shows the method by which the action of the spring is transformed into pen motion.

Then the instrument manufacturer inspects the new tubing for such imperfections as slivers, die scratches, nicks due to rough handling, outside and inside cleanliness, tensile strength, elongation, plus much other detailed inspection depending on the end use of the tubing.

A slight die scratch might not be a fault in a piece of pipe but a die scratch one thousandth of one inch deep can cause early failure on a flexing thin wall tube. Also hard tube material with low percentage elongation might be desired for a static member but is definitely not suitable for a pressure responsive spring.

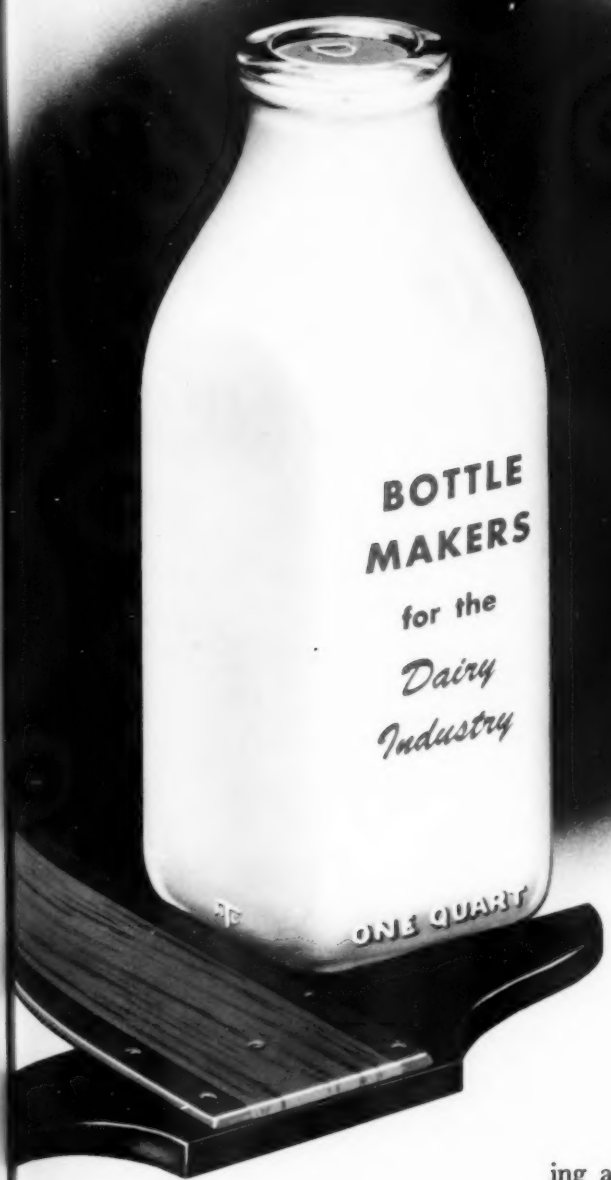
The tubing is preferably stored in a dry dust-free condition, after inspection

(Please turn to Page 56)

WHICH?

Increased Trippage

or a Cheaper Bottle



Does the dairy industry need a lower-priced milk bottle or a milk bottle that will increase trippage and thereby reduce distribution costs?

As we see it, a cheaper bottle means only lower initial outlay, *but does not reduce the basic cost of fluid milk distribution.* The economic facts are simple: if the milk container costs 1c and makes one trip, the net cost for distribution is 1c; if the container costs 5c and makes 50 trips, the net cost is only 1/10 of 1c. This is a mighty important consideration for milk plant operators faced with rising costs of operation and consumer resistance to price increases.

Thatcher Glass has consistently produced high quality, extra-trippage glass milk bottles. Whatever style, shape, or finish you prefer, Thatcher-made milk bottles are better designed, more uniform, and last for extra round trips. Give your dairy the opportunity for new operating and distribution economies with Thatcher glass milk bottles. Your dairy equipment jobber will supply you, or order direct.

MAKERS OF
THE ORIGIN
MILK BOTTL

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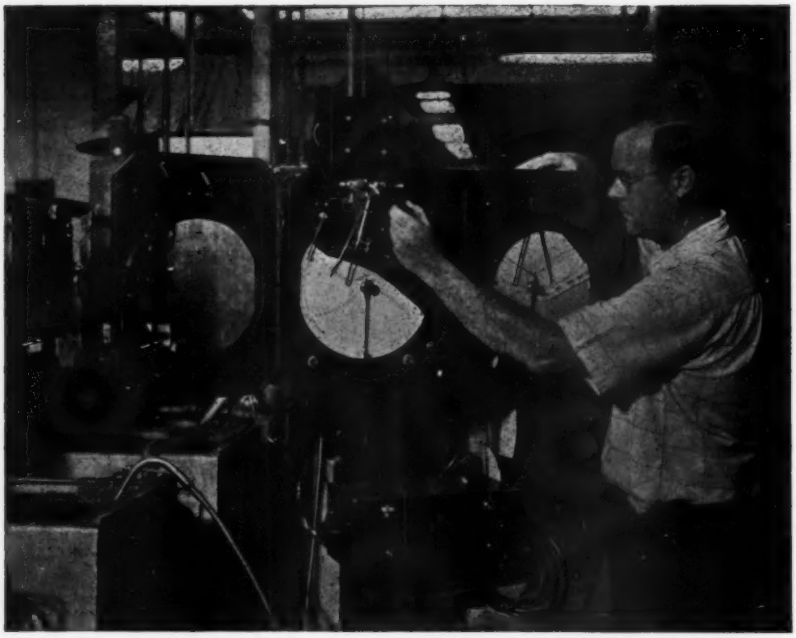

Testing and calibrating are major activities in the manufacture of instruments. Here the operator is adjusting the cut-out which operates the Flow Diversion Valve. Because of the uncanny accuracy built into these instruments no unsatisfactory milk can get through to the bottling machine.

ACCURACY IS THEIR BUSINESS

By **NORMAN MYRICK**

AN INSTRUMENT FACTORY is like an iceberg; it's not what you can see but what you can't see that is most important. You can't see accuracy. Yet if an instrument factory is anything it is the well spring of accuracy.

In an instrument factory the tangibles are few and the intangibles are many. You can see lathes in the machine shop turning out parts. You can see intricate little machines making thousands of tiny screws. You can see people at benches soldering, wiring, inscribing, assembling and testing but you find it difficult to put your finger on any one thing or series of things and say "Ah, this is how instruments are made. This is the nub of the thing". It is not particularly difficult to devise an instrument that will record, or measure, or control but it is enormously difficult to make an instrument that will do these things accurately, do them faster and better than a human being could do them, and do them day after day after day without a let up or relapse. You can't see accuracy but in an instrument factory you come about as close to the visible reality of the abstraction as mortals are ever privileged to get. Try drawing a picture of accuracy sometime. The chances are you will end up with the sketch of an instrument.

The two dominant impressions that an instrument factory imparts are a sense of the bewildering variety of instruments that are made and the exhaustive calibration and testing to which each instrument is subjected. One firm that I visited had a panel arranged to demonstrate various items that instruments could measure. On this single panel seven different measurements could be observed. Temperature could be measured with an instrument so sensitive that simply by being in the vicinity it picked up the body heat given off by my hand. When I actually touched the instrument the pointer fairly zoomed across the chart. There was a means of measuring pressure, so keenly aware of variations that it could pick up and record the systolic and diastolic beats of the heart. Another company that I visited was working on an electronic device that would indicate, record, and control temperature of milk at sixteen key points in the processing chain. There were instruments that ranged from simple clinical thermometers to elaborate panels used by the Atomic Energy Commission at Oakridge and Hanford. There was a device designed to record the formation of ice on the wings of an airplane and there were instruments dedicated to taking the rectal temperatures of rabbits.

The Rabbit Has a Part

Some idea of the infinite variations of the instrumentation problem can be gained from the story of the rabbits. In the course of securing information to determine the purity of various drugs investigators are conducting experiments with rabbits. Drugs are injected into the animals and their reaction is studied. One phase of the study involves taking the rabbits' temperature. This is done rectally and a delicate instrument is made for that specific purpose. In the early stages of the experiments the investigators found that the temperatures they recorded were not what they expected to find. Indeed the disparity was so marked that the accuracy of the instruments was questioned. The instrument people were certain that the instruments were accurate but obviously something was wrong. The denouement came when laboratory technicians discovered that the portion of the instrument that came in contact with the rabbit was of such a character that it added little to the rodent's peace of mind, as a matter of fact it made him downright uncomfortable. Now when a rabbit is uncomfortable

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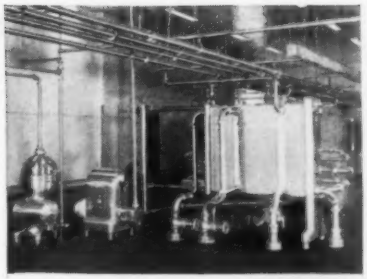
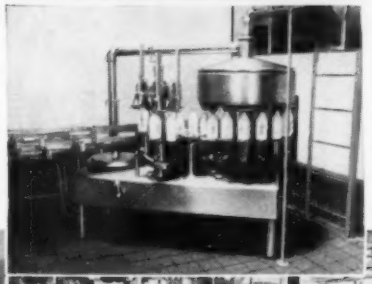
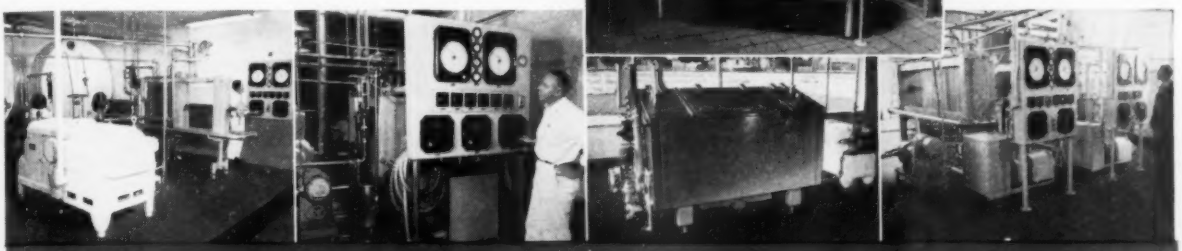


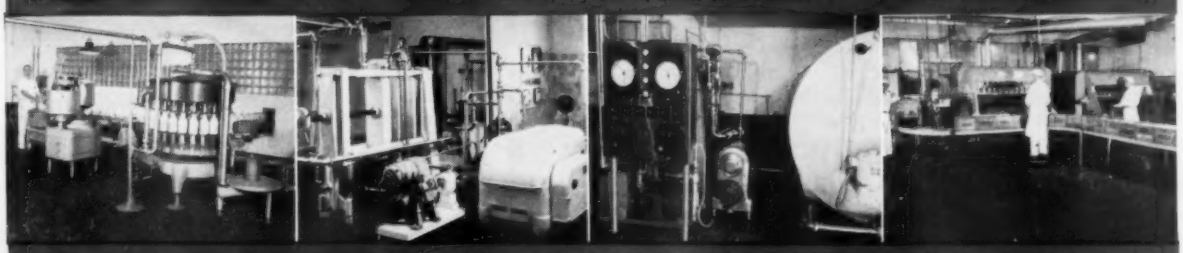
Knudsen Creamery Co., Los Angeles. 18,000 lbs. per hr. Model "S" Superplate Shortime Pasteurizer; Meterflo Pump; No. 288 DeLaval All-Stainless Clarifier.



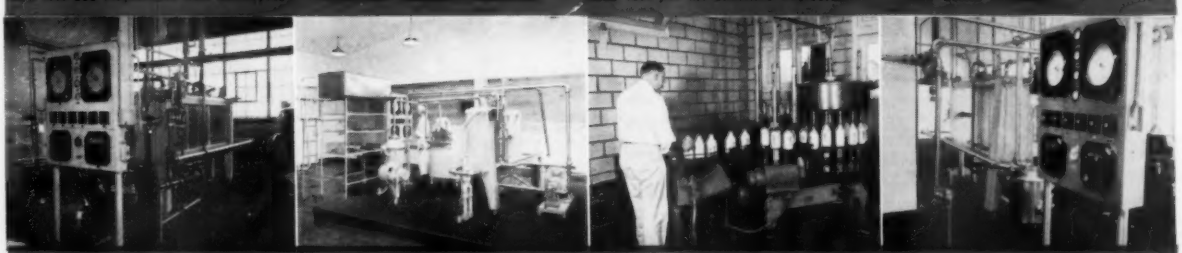
Roger Jessup Certified Farms, Glendale. Gra-Vac Model K-16 All-Stainless Filler and Capper.



Golden Creme Farms, Los Angeles. Model 1041 Viscolizer, 8000 lbs. per hr. Superplate Shortime Pasteurizer. — *Beverly Dairies, Glendale.* 7500 lbs. per hr. Superplate Shortime Pasteurizer. — *Community Dairy, Pasadena.* 200 gal. "CC" Spray Pasteurizer with Sentinel Control; Model 441 Viscolizer. — *Adhar Milk Farms, Los Angeles.* 18,000 and 12,000 lbs. per hr. Superplate Shortime Pasteurizer.



Royal Farms Dairy, South Gate. Model 24 Gra-Vac Bottle Filler and Capper with No. 600 Adjustable Roll Conveyor. — *Rockview Milk Farms, Downey.* No. 641 Viscolizer, 6000 lbs. per hr. Superplate Shortime Pasteurizer. — *Inglewood Farms, Inglewood.* 1500 gal. Type "D" Storage Tank; Meterflo Pump; 4000 lbs. per hr. Shortime Pasteurizer. — *Golden State Co., Ltd., Los Angeles.* Two 12-Wide Model "F" Sanitor Plate Bottle Washers.



Mountain View Dairies, Long Beach. 10,000 lbs. per hr. Superplate — *Symons Dairy Farms, Pasadena.* DeLaval Clarifier; 8,000 lbs. per — *Beverly Dairies, Glendale.* G-150 Nuline Filler and Capper. — *Roger Jessup Certified Dairy, Glendale.* Superplate Shortime Pasteurizer.

There are several other interesting dairy plants in this area which you may wish to see. Contact our Los Angeles Office for their names.

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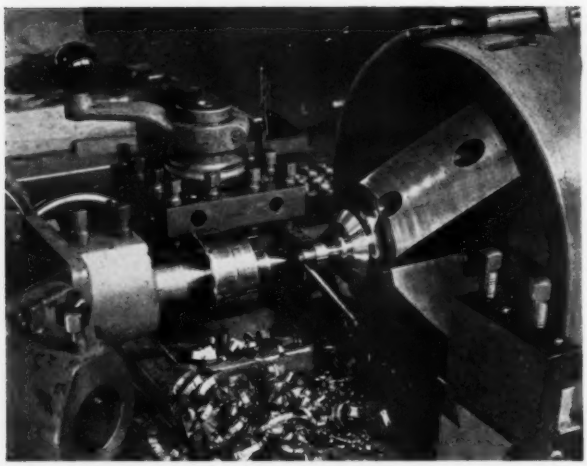


Production operations, such as this turret lathe turning out a stainless steel Flow Diversion Valve plug, are easy to understand.

More difficult to grasp is the unrelenting quest for accuracy reflected in this general view of calibrating baths.

his temperature rises. The situation called for a redesign of the measuring element more in sympathy with the peculiarities of rabbit physiology. Once this was accomplished the temperature measurements proceeded in a manned satisfactory to all concerned including the rabbit.

Since the war electronics have emerged as a splendid new ally for the instrument maker. As yet, however, electronic instruments in the dairy field are not in extensive use. Thermal systems that depend on temperature to increase or decrease the pressure of a liquid or gas, which in turn provides the force necessary to activate the pen on a recording chart, are the most widespread type of instruments found in the milk business. The elements in this type of instrument are the bulb which comes in contact with the milk or whatever is being measured, the capillary which is the connecting line or tube between the bulb and the instrument panel, the Bourdon spring which expands or contracts according to the pressure impulses it receives from the bulb via the capillary, and a system of linkage that converts the expansion and contraction of the Bourdon spring into pen motion across the chart. With this system as a base a well nigh infinite number of combinations can be made.

The actual manufacture of these elements, although demanding skill and a high degree of accuracy, is not spectacular. There are, of course, some fascinating techniques and long experience in manufacture has resulted in the elimination of waste motion that is a joy to see. But the fact remains that the truly thrilling part of instrumentation lies in what is not seen rather than in what is seen.

Craftsmanship and Springs

The heart and soul of a thermal system is the Bourdon spring. The Bourdon spring is simply a flat tube that has been made into spring. When the pressure inside of the tube increases the spring tries to straighten out. When the pressure decreases the spring tries to curl up tighter. It operates somewhat like those paper gadgets kids have at birthday parties. Blow into the mouth piece and the thing uncurls. Stop blowing, that is relieve the pressure, and the thing curls up again. The variations in pressure transmitted from the bulb through the capillary tube to the spring cause the spring to expand or contract. It is this expansion and contraction, appropriately linked up to the pen arm, that causes movement of the pen.

The spring is made of flat tubing, usually stainless steel, phosphorus bronze or beryllium copper. The springs are wound on a lathe into either a flat spring or a helical, spiral spring. The trick in spring winding is to retain the cross section of the tube. In order to accomplish this the tube is filled with sand or some other similar substance. There must be no kinks in the finished spring, no differences in metal, no flat places. When completed the spring is an extremely fine and accurate piece of work.

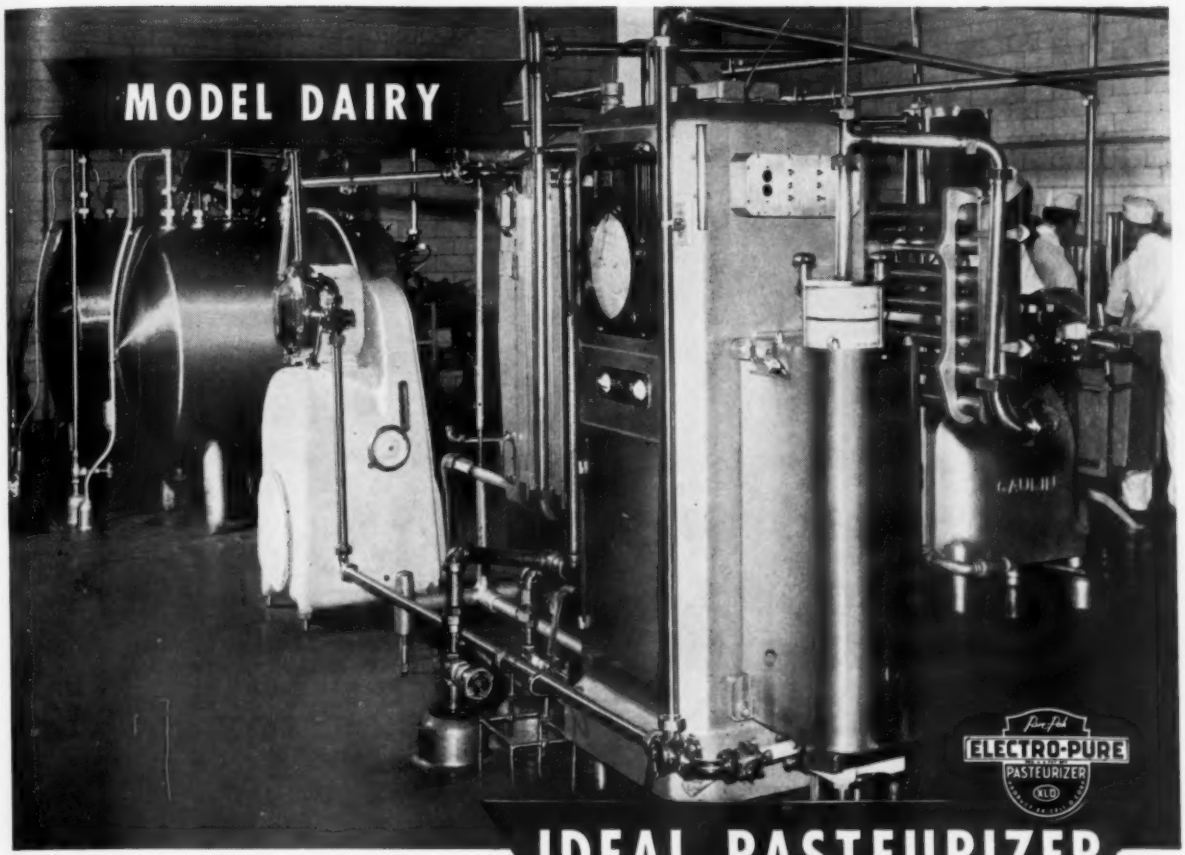
A unique development in the manufacture of the bulb has been the use of atomic hydrogen arc welding. Ordinary methods of welding leave a scale which requires an extensive amount of refinishing and is likely to leave small pits that would present a sanitation problem in the dairy plant. In the atomic hydrogen arc process a spray of burning hydrogen surrounds the welding electrode. Hydrogen leaves no by-product except water. Oxygen is excluded because of the presence of the hydrogen and no scale can be formed.

Vapor, Temperature, and Pressure

A common thermal system used in dairy plants is the vapor pressure system. In this type of system the bulb is filled with some organic liquid, usually methyl-chloride. As the temperature varies the amount of vapor that this liquid gives off varies. The higher the temperature the greater amount of vapor is given off and consequently the greater is the pressure. The liquid is called the actuating liquid. This liquid completely fills the measuring spring, capillary tubing, and part of the bulb. The vapor is all contained in the remainder of the bulb.

Filling the system with the necessary liquid is a tricky operation. The character of the actuating liquid means that the filling must be done in a special room. The filler tube is placed in a manifold and a high vacuum is pulled. The vacuum is held for a period of time depending on the length of the capillary and liquid is allowed to enter. The filling techniques vary. Sometimes the system is completely filled and the excess removed until the desired amount of liquid remains. Another method is to put in just exactly enough. In either case when the filling operation is completed the exact amount of liquid in the system is known.

Once the system is filled it goes to an assembly point where it is hooked up with the linkage arrangement and the pen and installed in the familiar box. The practice of assembling a number of instruments on one panel or as a complete packaged unit makes for a compact centralized arrangement but it also reflects the influence of organized labor. Before the advent of the packaged unit where all tubing, wiring and



Model 100 Electro-Pure Pasteurizer operating in the Deerfoot Farms "model milk plant", Newton Upper Falls, Mass.

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High craftsmanship and superb engineering techniques are necessary in assembling the delicate parts of a temperature measuring system. Workman in this picture is joining capillary to thermometer stem.

One of the thrills of modern production is to watch a man equipped with the proper tools perform a task he knows how to perform. The operator here is joining together segments of glass tubing of varying bore size.

other parts of the complete instrument are contained it was necessary, because of union regulations, to have a plumber do a part of the work of installation, an electrician do another part and some other craftsman another part. This leads to excessive costs and considerable variation in workmanship. The solution was to perform as much of the work as possible in the factory so that when the unit reached the milk plant all that had to be done was to make a few connections and the instrument was ready for business.

Testing Is the Big Wheel

Once the assembly is complete the process of testing and calibration begins. Indeed, so vital is this phase of instrument manufacture that as far as space and activity go one gets the impression that it is the dominant activity in the factory. One instrument man observed that building instruments is "25 per cent building and 75 per cent testing". The instruments must be accurate and the business of calibration and testing is the final manifestation of accuracy. One sees row after row of instruments undergoing tests and calibration adjustments. Calibrating practice involves the use of a bath of known temperature. The bulb of the instrument to be calibrated is placed in the bath and the action of the pointer is adjusted to correspond with the actual temperature of the bath. Small variations in the action of the Bourdon spring is the reason for calibration. It is possible to make each Bourdon spring so that it will react exactly as another spring made for the same purpose. However, springs of that nature would cost so much as to be prohibitive. The best practice is to strike the logical mean between cost of spring manufacture and similarity of spring action. The slight variations can then be accounted for by means of calibration. The result is that each instrument is calibrated and adjusted against known temperatures so that when the job is finished both economy and accuracy have been satisfied.

Outside of the field of dairy instrumentation there are instruments that must measure extreme variations of temperature. In order to get the necessary temperatures instrument manufacturers must employ ingenious methods. A molten salt is often used when very high temperatures must be used. For lower temperatures but temperatures still well above the boiling point of water, peanut oil is used. This oil boils at 400 degrees F. At the bottom of the temperature scale liquid nitrogen is sued as a cooling agent in the closest approaches to absolute zero.

Ink Must Be Right

One would not ordinarily give much thought to the question of charts and ink. Yet here again the problem of accuracy and speed under varying conditions must be met. Charts vary. Each chart covering a different pressure and temperature range must have a different scale. The charts are printed under controlled conditions of temperature and humidity. As temperature and humidity vary the physical dimensions of the chart vary. It is necessary, therefore, that each chart be printed under exactly the same conditions as other charts designed for the same type of instrument. Each chart will react in the identical manner as the conditions of temperature and humidity vary. Similarly the ink that is used must be ready to operate under diverse conditions.

Accurate measurement and accurate control are vital factors in the production of quality dairy products. It is the function of the instrument manufacturer to provide that measurement and that control. When dairymen and the health departments specify 143 degrees for thirty minutes they mean 143 degrees for thirty minutes not 142 for twenty-nine minutes. The milk plant operator wants to know what the temperature is now, not what it was five minutes ago. And so the instrument people have built the instruments that will do these things. They have developed instruments that will record the beat of a heart and the weight of a typewriter dot. They have built a device that will regulate valves faster and more accurately than a hundred men could. With electronics and peanut oil, stainless steel and ether, with infinite skill and patience they have woven a fabric of accuracy that is the proud banner of modern instrumentation.

TEN COMMANDMENTS FOR MAINTAINING INSTRUMENTS

By WENDELL S. YOUNG
The Foxboro Company

1. **DO** carefully follow instructions furnished by instrument manufacturer. Remember that an instrument is a valuable piece of mechanism, and with a reasonable amount of care will give years of satisfactory service.
2. **DO** select a location for the instruments which is well lighted, free from vibration, and free from wide and sudden variations in temperature. Mount instrument on a rigid support with the case level.
3. **DO** use clean dry air at the recommended pressure and blow out the air filter-dripwell at least once daily. Keep all connections in air piping tight and free from leaks and never use corrosive pipe or tubing. Proper attention to this detail will eliminate the greatest source of controller trouble.
4. **DO** make sure the electric supply voltage and frequency are the same as specified for the instrument. Connect and insulate all wiring in accordance with the "National Electrical Code".
5. **DO** fasten the connecting tubing between instrument case and bulb firmly, to prevent mechanical injury or damage from vibration, using cleats, staples, tape or other means. Make sure the tubing is not compressed or damaged during this operation. Broken tubing necessitates repair of the complete thermal system.
6. **DO NOT** make any calibration changes unless it is certain that the test thermometer reads accurately and that both bulbs are subjected to the same conditions. If the bulb is removed from its normal location for checking in a can or pail of water, the test should be made with the bulb at the same elevation as it was when installed on the apparatus, and good circulation is essential to insure that the temperature at the instrument bulb and test thermometer is uniform.
7. **DO NOT** expose a temperature bulb to higher temperatures than the maximum range of instrument unless instrument is designed for this condition — if necessary, first remove the bulb.
8. **DO NOT** allow a stream of water or jet of steam from hose to come in contact with instruments when washing or flushing down room. Instrument cases are dust and moisture proof but carelessness can result in damage.
9. **DO NOT** use charts manufactured by anyone except the instrument manufacturer for maximum accuracy. Occasionally wash out pens with clean warm water to insure a good temperature record.
10. **DO NOT** make any adjustments not covered by the instruction book unless specific instructions have been given. Consult the instrument manufacturer when in doubt.

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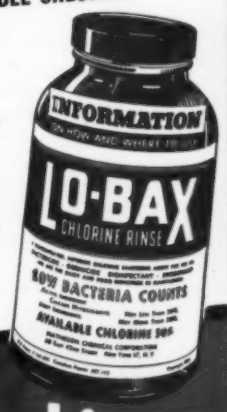

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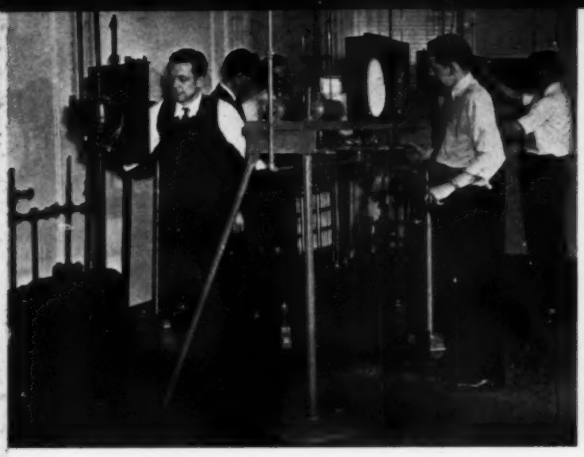

An important phase of instrument manufacture is to educate customer's instrument men in the proper use and maintenance of the equipment. Here students are introduced to the fascinating insides of electronic instruments.

AN INSTRUMENT ENGINEER LOOKS AHEAD — AND AROUND

By **JACK MEYER**
Brown Instrument Division
Minneapolis-Honeywell Regulator Co.

WHEN WORLD WAR II cut off America's imports of tin and other strategic materials, American evaporated milk processors were faced with a difficult problem. Previously, they had used a solder containing 40% tin for sealing vent hole cans, and had obtained satisfactory results over a wide temperature range. The new war-time solder, containing only 20% tin, had a much narrower melting range and showed a disturbing tendency to either become overheated and run right through the hole, or too cool, in which case it would not properly seal the can.

Several instrument companies were approached with a view toward obtaining a control device which would regulate the amount of heat applied to the tipper and thus maintain the solder temperature within the extremely narrow range needed for good results. To the surprise of the canners, they found that such a controller was widely known throughout many other industries, and was frequently used for just such an application. With a few modifications, this instrument (a pyrometer) soon solved the problem, proving its value so conclusively that many companies equip their new can sealers with such controls even though "40-60" solder is again available.

This incident has dual significance for the dairy industry. First, it probably represents the industry's first contact with the science of pyrometry (temperature measurement employing a thermocouple), and secondly, it shows that the Dairy Industry shares many problems with other groups, and that progressive ideas developed elsewhere can often be adapted to the dairyman's own particular needs. At the same time, the manufacturers of electrical temperature measuring instruments became suddenly aware that the Dairy Industry represented a vast undeveloped potential market.

About this time, the instrument industry was giving birth to the electronic potentiometer, a simple, rugged, accurate instrument that makes it possible to solve many complicated and challenging problems involving the measurement and control of process variables. Although the filled, pressure-type thermometer will continue to be used for many routine temperature measurements and control where the demands for accuracy are not too great, these electronic instruments are solving an increasing number of control problems where it is desired to maintain temperatures within limits of a degree or less.

Look to Your Laurels, Aladdin

Accuracy and close control are not the only advantages of electronic instruments. Multi-record instruments, printing up to sixteen temperatures on a single chart, and multi-point indicators which show, at the push of a button, the temperature at any one of 48 different points, aid materially in the consolidation of records, the simplification of instrument maintenance, and the centralization of process control. Since electronic instruments do not have to be mounted close to the point of measurement, it is practical to have on the main floor of a plant a multi-point recorder which indicates and records the temperature of milk stored in tanks on the floor above.

Nor is temperature the only variable which can be gauged by instruments of this type. Since the potentiometer is essentially a device for measuring small variations in electrical quantities, it can be used to indicate, record, and control any process variable that can be converted into electrical terms. These include flow, weight, pH, causticity, conductivity, density, pressure and others.

While it would be a gross exaggeration to claim that all process control improvements in the future will come as a result of electronic instrumentation, even the brief experience of the industry to date serves to indicate that this new addition to the available supply of measuring instruments gives dairymen a new means of measuring and controlling many variable factors affecting processing. The complete elimination from milk manufacturing processes of the elements of chance, guesswork, and arbitrary estimation may well be the goal of the dairy industry for the next few years.

The importance of allowing for all variable factors that might effect proc-

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essing was dramatically shown by the experience of an ice cream manufacturer in the southern part of the country who has been carrying on an intensive investigation of conditions influencing the composition and texture of ice cream produced in continuous freezers. He discovered that his freezer operator had extreme difficulty in controlling the stiffness and overrun on hot, humid days, while operations progressed more smoothly in cooler weather. Seeking to correlate weather with the freezing process, he soon realized that the direct result of high humidity is an increase in the coating of ice which forms on the pipelines connecting the battery of freezers to the packaging machine. Since *each pound of ice formed on these lines* represents a *heat gain* of *well over a thousand BTU's*, difficulties in controlling the stiffness of ice cream produced under such conditions are only to be expected. After a few hours of operation, such pipes become frost covered and this effect practically disappears, but it is very evident at the start of operations. Complete control of the moisture content of the air will prevent this phenomena and allow the freezer operator to more closely determine the stiffness and overrun of his product. It is worthwhile to note in passing that the manufacturers of electronic instruments have made significant discoveries in their studies of ice cream freezing phenomena and are at present attempting to bring about completely automatic control of both overrun and ice cream stiffness.

Although the butter manufacturer at present uses technique and equipment that differ vastly from those employed by the ice cream maker, the importance of controlled air conditions is already appreciated by many butter makers. Churning, working, and packaging butter in cool, fairly dry rooms is felt to be a possible answer to many of the problems of the butter industry.

Butter of the Future

A more revolutionary solution to the problem of efficiently producing top-grade butter was recently suggested by one of the country's leading experts on butter production. He remarked that the industry might do well to take a note from the booklet of its oleo-making competitors by reducing all butter to water-free natural fats, and reconstituting it in Votator-type processing equipment to obtain the body and spreadability that would be most pleasing to the consumer. Additional merits of this scheme, not evident at first glance, are that concentrated, de-aerated butter oil keeps better and takes up less storage room than regular butter, and that "summer butter" fats and "winter butter" fats could be blended to make butter with a uniform melting point.

In the reproduction of the carefully textured butter having an accurately established pre-determined percentage of water, fat, and milk solids, the temperature control of the mixture leaving the texturing equipment might best be accomplished by the electronic potentiometer, which is already used for this purpose in other branches of the food industry. Other equipment used in separating and de-aerating the butter oil could be controlled by the electronic type of instrument or by thermometer controllers, depending on the accuracy and type of control action required.

Processes involving the concentration of milk and other substances to a given specific gravity can also be controlled through the adoption of a continuous density measuring system already in industrial use. All of the devices needed to accomplish this for some products are already available, and some modifications are being made to meet sanitary requirements.

HOT DOPE ON ACCOUNTING

Beginning in the November issue of the "*American Milk Review*" M. J. Kluger, well known Philadelphia dairy accountant will conduct a page devoted to accounting problems. Address your questions to M. J. Kluger, Kapleau, Kluger & Company, 1414 South Penn Square, Philadelphia, Penn.

In the condensing plant of the future—the very near future—the milk to be concentrated will be analyzed and standardized and a series of control devices will be set manually. Then, automatic controls will take over the job of forewarming the milk, admitting it to the pan, adjusting the steam pressure in the heating coils in accordance with the level of the milk and the vacuum being maintained, and determining the the final concentration at which the milk will be allowed to leave the pan. It will be possible to make adjustments for either continuous or batch operation. The continuous record of product density made by the instrument will serve to assure the quality control men that the concentrated milk meets specifications.

C.I.C. As They Say in the Navy

These, and other unit process control applications are only a small part of the job that instruments will do in the dairy plant of the future. There is a wide-open field for their use in centralization of process control and supervision. For years, sanitarians have been saying that instruments do not properly belong in the same room with processing equipment, and for years dairymen and instrument men have replied that the very nature of the thermometer type of instrument requires that the instrument be located near the process, since long lengths of capillary tubing decrease response speed and increase the instrument and the danger of breakage. Pneumatic transmission systems have now been perfected to the point where readings can be instantly transmitted considerable distance, and electronic instruments are, by nature, ideally suited to remote location, so that it is almost inevitable that many of the instruments now scattered throughout the plant will soon be concentrated in central control offices.

The concentration of instruments will greatly lighten the supervisory load on plant managers and will also facilitate the maintenance of instruments and the keeping of processing records. Since it will be possible to measure all important variables at any point in the plant by merely pushing buttons, and to follow processes by a glance at the appropriate chart records, deviations from the normal will be instantly detected, and appropriate action taken before damage to the product of the equipment can result.

Assist for Cost Accounting

Accounting for the costs of individual processes, which has come in for considerable attention of late, will also be made easier in the larger plants by complete records of the steam consumption of the various pieces of processing equipment. When these charts are compared with temperature records, which show exactly when a given piece of equipment was in operation, and with the daily production of that piece of equipment, it will be a simple matter to compute manufacturing costs.

It is, of course, impossible to look into the future and tell exactly what dairymen will be doing ten or twenty years from now. These, however, are the trends which have been established over the past few years and the uses which are now being contemplated for, or already being made of the new and improved instruments available to the Dairy Industry. For years, the treatment of milk and milk products so that they would reach the consumer in a wholesome and palatable state was a most difficult task for the processor. With the help of instrument manufacturers, this job has been accomplished so that the emphasis now has shifted to efficiency; and the immediate goal of the industry is the most economical utilization and the most equitable distribution of the available milk supply. At this point, it seems quite safe to predict that close and continued cooperation between instrument men and dairy men will see the Milk Industry progress rapidly and constantly toward this objective in the years ahead.

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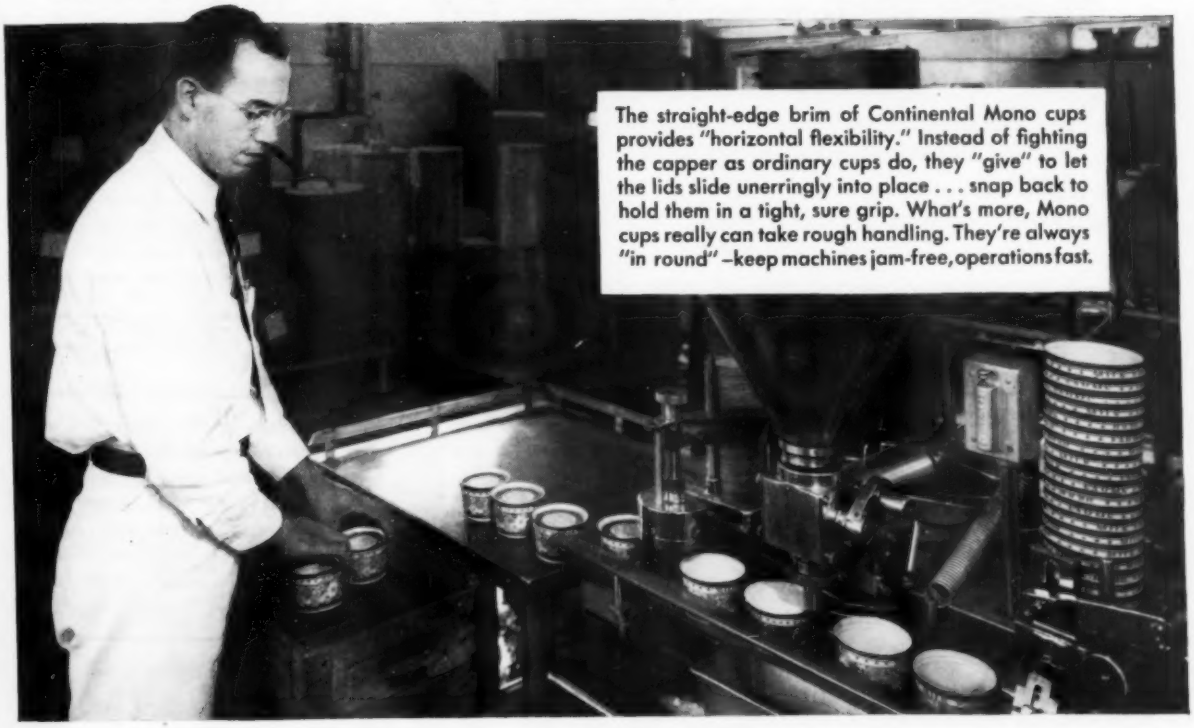

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C. H. HASKELL, *President, Beatrice Foods, Inc.*

In recognition of the important job being done for the entire dairy industry by the National Dairy Council, this publication gladly contributes this space.

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Instrumentation For

H.T.S.T. PASTEURIZATION

Accuracy, Speed, and Safety Are Features of Proper Instrumentation Which Enable the H.T.S.T. Pasteurizer To Satisfy the Law and Operate Efficiently

By **WENDELL S. YOUNG**
The Foxboro Company

FOR HIGH temperature-short time (H.T.S.T.) pasteurization, the U. S. Public Health Code states that every particle of milk must be heated to at least 160°F., held at that temperature for at least 15 seconds, and immediately cooled thereafter to at least 50°F. However, the milk processor does not want his milk heated any higher or any longer than the law requires. Instrumentation properly applied to H.T.S.T. pasteurization completely satisfies legal requirements of dependable measurement and control and processor requirements of quality protection.

The Pasteurset System

Fig. 1 shows diagrammatically a H.T.S.T. pasteurizing system and its instrumentation. There are two instruments which must be used on every H.T.S.T. installation if legal requirements are to be met. The first is the Heater Temperature Controller. The bulk of this instrument (A) is located in the hot water pump outlet line and controls the hot water temperature, and milk temperature indirectly, by positioning the control valve (F) in the steam line.

The second required instrument is the Pasteurlog or Flow Diversion Valve Operator. This instrument (B) records the milk temperature and controls the direction of milk flow. The Pasteurlog also has an operation pen which records the frequency and duration of operation of the flow diversion valve. The bulb is located in the dual fitting at the end of the holding tube. If the temperature drops below the set point, the solenoid valve (H) is energized and supplies air to the motor of the flow diversion valve (G). The solenoid valve is generally mounted on the flow diversion valve. It is wired in series with the operation pen and its action is recorded on the chart.

The Cold Milk Recorder (C) records the temperature of the cold milk as it leaves the cooler. The use of this instrument in the Pasteurset System is generally optional although it is required in some districts.

When brine or other refrigerant is used in the cooling section of a H.T.S.T. system, control is necessary to prevent freeze-ups. The diagram shows a Temperature Controller (D) and control valve (J) controlling brine flow. The cold make-up brine is added in sufficient quantities to maintain temperature. Simultaneously the back pressure valve (L) exhausts warm brine as required to keep the pressure in balance. As an additional safety feature, a solenoid valve (K) is placed in the air line to the control valve and wired in series with the flow diversion valve. When the diversion valve diverts the milk flow, the solenoid valve exhausts air from the motor of the brine control valve, causing it to close instantly and thus prevent freezing milk which is in the cooler.

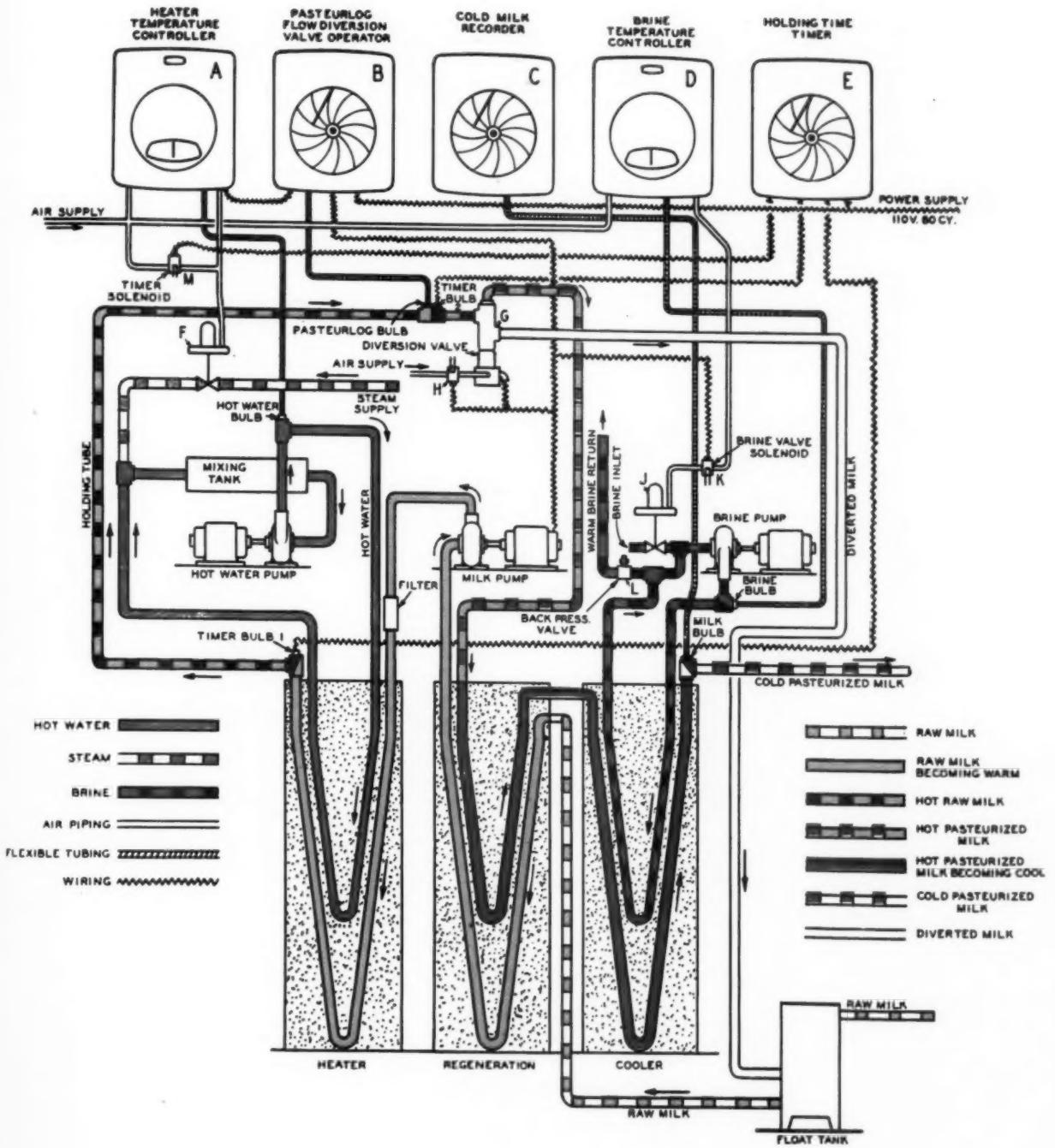
At the present time the two methods most commonly used for measuring the holding time of H.T.S.T. units are the salt test and dye test. However, recognizing that these tests are time consuming and must be performed by an experienced operator if high accuracy is to be obtained, an instrument has been developed, and is now available to the industry, which gives H.T.S.T. timing turn-of-a-knob simplicity and high sustained accuracy. The instrument (E) is a temperature recorder which measures either the holding tube inlet or outlet temperature (depending on switch position in instrument) and by means of an automatically introduced heat impulse (with solenoid M) the holding time is quickly and accurately determined. Turning the switch to position 1 causes the instrument to record the temperature at bulb 1 (inlet of holding tube) and energizes the solenoid (M) causing the steam valve (F) to go wide open (steam valve (F) automatically returned to control of Heater Temperature Controller (A) after approximately five seconds). This imparts a heat impulse to the milk which is recorded by the Timer (E). The switch is then turned to position 2, causing the instrument to record the temperature at bulb 2 (outlet of holding tube). When the heat impulse reaches bulb 2 it is again recorded by the Timer (E). The difference in time between when the heat impulse reached bulb 1 and when it reached bulb 2 can then be determined from the chart (chart has one second time arcs) and this difference in time is the holding time.

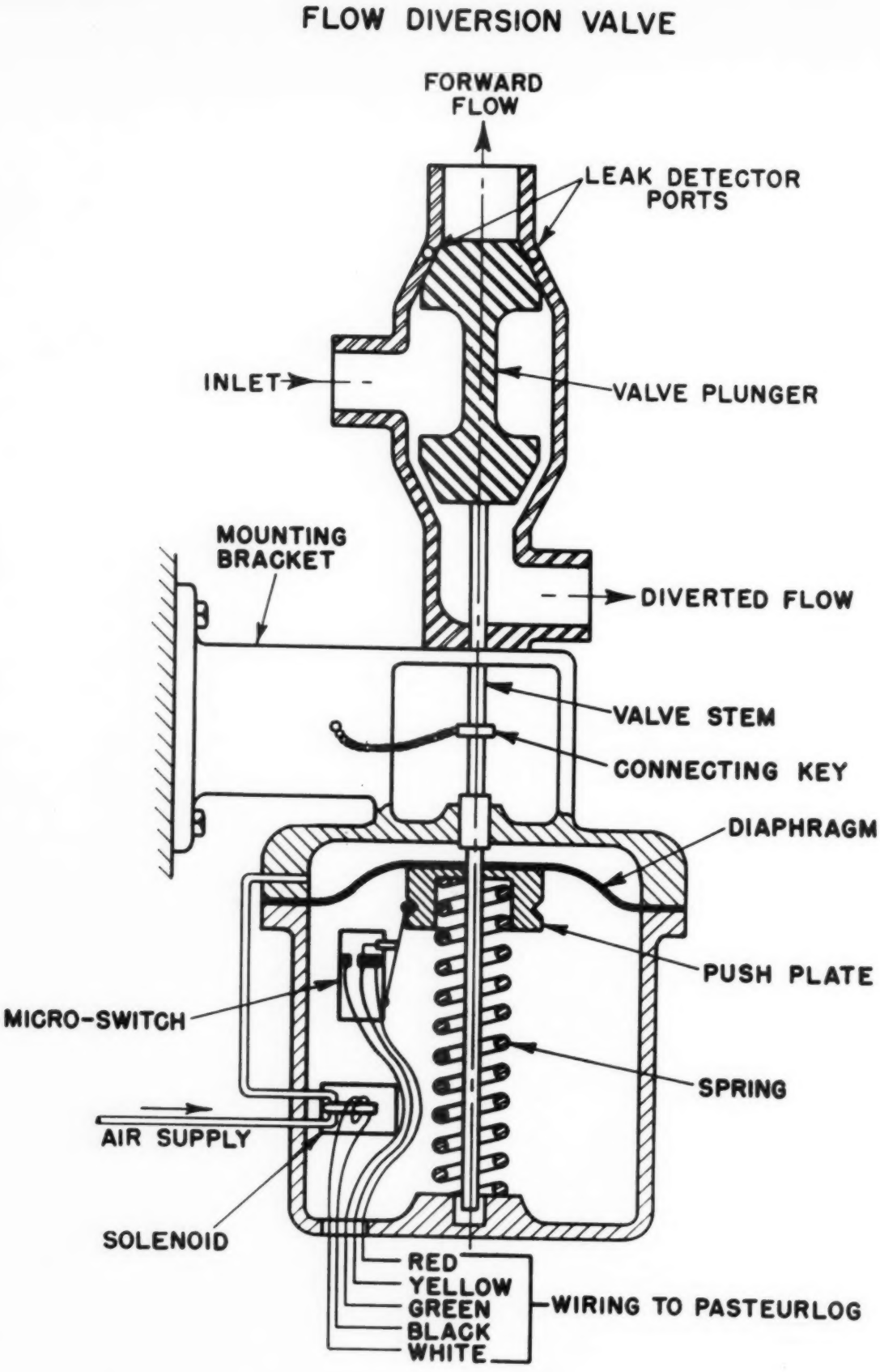
The above has been a brief description of the Pasteurset System and its possible instrumentation. The instruments will now be discussed in more detail. In practice two instruments are sometimes combined in one case to make a dual instrument, but for the purpose of discussion it is best to treat each one individually.

Heater Temperature Controller

Controllers are generally classified as on-off, proportional, proportional with reset, and proportional with reset and/or derivative. All of these are based on one type of control and this is proportional. Instead of opening and closing a control valve about a control point as the on-off controller does (a special case of proportional control having essentially a zero proportional band), the proportional controller controls the temperature somewhere within the proportional band. The

THE PASTEURSET SYSTEM

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proportional band is the percent of total scale (instrument range) through which the pen or pointer must travel to move the control valve from open to closed. Temperature applications in which a small change in steam flow causes a large effect on the temperature require proportional action on the valve and thus a proportional controller.

On processes that require a large degree of proportioning action (wide proportional band), and in which the valve opening must vary greatly, an ordinary proportional controller will not hold the temperature within very close limits. This is generally true on H.T.S.T. pasteurizer heaters because of the large change in temperature caused by a small change in steam flow. A little imagination will show that an instrument which controls a temperature within a band will not be satisfactory when extremely close control is required. To meet this problem the proportional with reset controller was developed. Its action is such that it continually alters the valve position as long as there is any difference between pen and control point setting. This is accomplished by automatically moving the proportional band up and down scale about the control point and permits the instrument to control the temperature at the control point instead of over a band. In some cases control can be further improved by the addition of the derivative function. Essentially, derivative speeds up the valve positioning by the instrument, over that which would be obtained by proportional action only.

From the foregoing it is seen that the Heater Temperature Controller should be of the proportional with reset type (sometimes proportional with reset and derivative is desirable). Some of the older installations use an ordinary proportional type of controller, but this requires the use of an auxiliary pressure controller and control valve to smooth out plant steam pressure fluctuations and the over-all control is generally not as good. This type of installation is unnecessary with modern instrumentation.

The Heater Temperature Controller generally uses a vapor pressure type of thermal system for two reasons; the vapor pressure thermal system has the fastest response of any filled system and its characteristic increasing scale gives wide, easy-to-read temperature divisions at the pasteurizing temperature. The instrument also has an electrical contact (closed when control index is set to bottom of scale) which permits by-passing the electric control circuit in the Pasteurlog. Closing this contact causes the flow diversion valve to take the "forward" flow position. This by-pass contact is used for cold sterilization. In districts where cold sterilization is not allowed the wiring between the Heater Temperature Controller and Pasteurlog is omitted making the by-pass contact inoperative.

Pasteurlog

The heart of the Pasteurlog or Flow Diversion Valve Operator is the Rotax (electric) contacts. These contacts, positioned by the temperature measuring system, de-energize the electrical circuit to the flow diversion valve (solenoid mounted on valve) causing it to "divert" when the milk is below the legal pasteurizing temperature and energize the circuit to the flow diversion valve causing it to take the "forward" position when the milk is at or above the legal pasteurizing temperature. The contacts are usually set to cause diversion at 161°F. and a return to forward flow at 162°F. Th electrical lockup or temperature gap between diversion and a return to forward flow eliminates relay chattering and gives positive operation of the flow diversion valve. The diversion point can be easily changed by means of a micrometer screw. However, this micrometer screw setting index should be sealed by an inspector (the seal wire is passed through holes provided for this purpose) as required by law.

In this authoritative article Mr. Young has discussed important problems of instrumentation in High Temperature Short Time pasteurization. Inasmuch as he is more familiar with instruments supplied by his own firm than with any others he has naturally considered the subject in terms of these instruments. Underlying principles, however, are applicable to all instruments of this type regardless of their manufacture.

The Pasteurlog generally uses a vapor pressure type of filled thermal system for the same reasons as the Heater Temperature Controller, that is, because the vapor pressure system has the fastest response of any filled thermal system and because its characteristic increasing scale gives wide, easy-to-read temperature divisions at the pasteurizing temperature. The thermal system has two helical springs in the case, both actuated by the same bulb. One helical spring actuates the recording pen and the second the electric contacts. This construction is required in many districts to prevent any possibility of friction in the electric contact mechanism from affecting the recording pen, thereby insuring a true record of the milk temperature at all times.

The instrument also has an operation pen, as required by law, which records on the outer edge of the chart when the flow diversion valve is in the diverted position and when it is in the forward position. Although not required, the instrument usually has signal lights which indicate forward (green) and diverted (red) flow. The milk pump is generally wired in series with the Pasteurlog and flow diversion valve. The wiring is so arranged that the milk pump cannot operate unless the diversion valve is in the proper position. As an added safety feature the instrument generally has an electrical circuit for energizing the solenoid valve in the air line to the brine control valve when the milk flow is forward. The circuit is de-energized during diverted flow to prevent freeze-ups in the cooler.

Cold Milk Recorder

The Cold Milk Recorder is a standard temperature recorder and generally uses a vapor pressure thermal system for maximum response. The instrument generally has a reverse scale (low temperatures on outside of chart, high temperatures at center of chart) to provide maximum readability.

Brine Temperature Controller

The Brine Temperature Controller should be of the proportional with reset type, if good control is desired, for the same reasons as discussed for the Heater Temperature Controller since heaters and coolers are basically the same type of application from a control point of view. This instrument, also, generally uses a vapor pressure thermal system for maximum response and maximum readability.

Holding Time Timer

The heart of the Holding Time Timer is its continuously and stepless self-balancing electronic measuring system. The instrument is basically a single record temperature recorder with a switch which permits reading the temperature at either of two bulbs (inlet or outlet holding tube temperature). The switch is so connected that it automatically provides a heat impulse when it is turned to the number 1 position (inlet holding tube temperature and a small timer automatically stops the heat impulse at the end of approximately five seconds.

The instrument utilizes the resistance bulb method of temperature measure-

(Please turn to Page 50)

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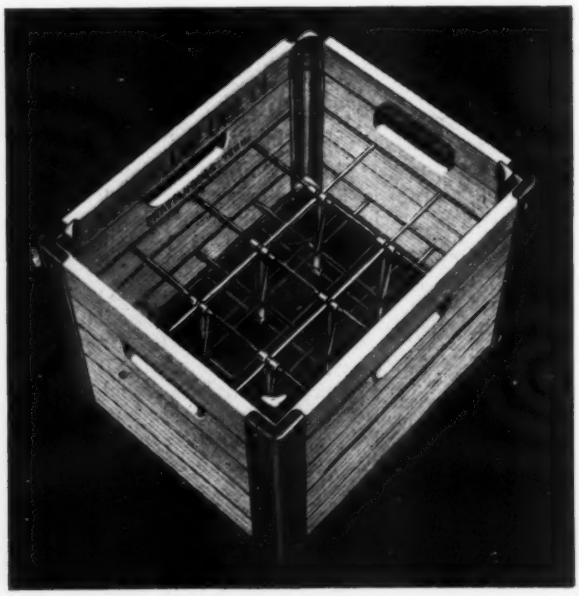

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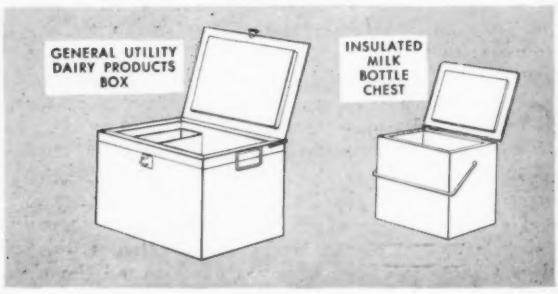

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Routine Maintenance of S T H T Control Systems

The Flow Diversion Valve was the final capstone in the development of practical short time high temperature pasteurization. In this article the man who brought the valve to its present state of perfection offers some sound suggestions for maintaining the great piece of equipment that the valve made possible.

By RAYMOND E. OLSON

Taylor Instrument Co.

IT IS WELL TO ESTABLISH a routine for periodically checking over vital points in a short time control system. Even though unsatisfactory performance of any kind has not been experienced, there are definite benefits to be derived from what might be termed "precautionary service".

The following procedure is recommended:

A–Clean air valve in pressure controller.

B–Blow out all air filters (recommended as a daily operation).

C–Clean air valve in temperature controller.

D–Check accuracy of Safety Thermal Limit Recorder pen. A regular 40 quart milk can makes an ideal test bath for this purpose. A steam hose is useful to bring the water up to temperature. Fully immerse the bulb along with a test thermometer of known accuracy. Vigorously agitate the water with a wooden paddle or similar stirring device, and after a period of at least 2 minutes, or until the recorder pen comes to rest, compare the pen indication with that of the thermometer. Quickly reset the pen position to agree with the temperature indicated by the standard thermometer by means of the micrometer screw provided on most makes. For best results this operation should be carried out by two persons, one reading the test thermometer and stirring while the other adjusts the recorder. An etched stem thermometer made according to specifications of the U.S. Public Health Service is made especially for this purpose. It is calibrated for 4" immersion with a range of 138° to 165° F. graduated in 1/5° divisions. For testing at temperature above and below this range, use a general test thermometer with a range of 30° to 220° F. in 1° divisions.

E – Check condition of rubber disc rings in Flow Diversion Valve and replace if wear is evident. Leakage through forward flow port will be indicated by milk running down the body from leak detector balls when valve is in diverted position.

F–Examine all air piping connections for leaks.

Unsatisfactory Performance Traceable to Conditions and Instruments

Lag in Reaching Fixed Milk Temperature

A–If milk temperature becomes slower in reaching that required to cause the Flow Diversion Valve to assume a forward flow position, it is probably due to insufficient steam pressure. Particularly, is this true if after reaching the forward flow point the milk temperature suddenly drops causing diversion and then again repeats.

Wandering of Final Milk Temperature

B–"Wandering" of milk outlet temperature can sometimes be accounted for in several ways. The milk flow should be checked to see that it is steady. A change in head of the raw milk supply if too great will cause variations in the milk flow rate which will be reflected in the final milk temperature, as shown on the Safety Thermal Limit Recorder chart. Another possible contributing factor may lie in the air supply to the controllers. This should be constant, within 1 lb., and if it varies more than this, the operation of the temperature controller may be adversely affected. Sudden changes in milk inlet temperature may also cause a disturbance in final milk temperature.

Continuous Fluctuations of Final Milk Temperature

C–"Hunting" or rapid fluctuation of the final milk temperature may be due to too high a steam pressure, or may be accounted for by erratic action in the pressure controller itself. For best operation, the steam pressure be *steady* and should not be more than about 5 lbs. above that required when the unit is operating with regeneration. A cleaning of the air valve in the pressure controller is usually all that is necessary to correct faulty pressure controller action although if the installation is 5 years or more old, the rubber diaphragm in the pressure controller valve should be examined. Also, the valve itself should be examined, for excessive stuffing box friction. "Hunting" can also be caused by improper temperature controller operation due to a dirty air supply. Its air valve should be cleaned. If this does not produce the desired results, the sensitivity adjustment in the controller should be changed. Regardless of make, an air-operated controller of the type used on HTS Pasteurizers is usually equipped with a means for changing its sensitivity. Lowering the sensitivity provides a means for reducing the amount of diaphragm valve movement obtained for a given temperature. When this is done usually the hunting action diminishes, providing all the equipment is in good mechanical order and that the steam pressure is not excessive. The criterion of performance is the air indication of the air gage showing diaphragm valve pressure. This should be steady between 8 to 10 p.s.i. On an installation that has been operating satisfactorily, it is emphasized that such a change in its sensitivity adjustment should be made only as a last resort. See also previously suggested procedure for servicing air-operated temperature controllers and make certain that diaphragm valve stem moves freely. Repack valve if in doubt.

Failure of Flow Diversion Valve to Operate When Milk Is at Correct Temperature

D – If the Flow Diversion Valve is inoperative and remains in its diverted position, the electrical and air supply

(Please turn to Page 57)

ELECTRONIC INSTRUMENTS FOR DAIRY PROCESSORS

By **JACK MEYER**

Brown Instrument Division
Minneapolis-Honeywell Regulator Co.

AN ENTIRELY NEW concept of temperature measurement – temperature by electronics – was revealed to milk plant operators at the Dairy Industry Show in Atlantic City last year. Although numerous questions were asked and answered at that time, the fundamental principles of electrical temperature measurement are still something of a mystery to most dairymen. Here are some of the "hows, whats and whys" of this new method of measuring temperature and many other process variables.

Electronic instruments are entirely different from the conventional thermometer, which measures temperature as an effect of the expansion and contraction of a liquid or gas fill in an enclosed, pressure-type system. Electronic systems utilize two entirely different effects – the change in the resistance of a wire with temperature fluctuations, and the variation with temperature of the output voltage of a thermocouple.

The "Resistance Thermometer"

You may have heard the statement that if you could keep a loop of copper wire at absolute zero (–273° Centigrade) and start an electrical current running through it, the current would keep up forever. That's a spectacular and imaginative way of saying that the colder a wire is, the less resistance it offers to an electrical current. Therefore, *the electrical resistance of a length of wire will vary with the temperature at which it is held.* With proper equipment to measure this resistance change, we can detect and measure a temperature change of a small fraction of a degree.

Measuring Small Electrical Quantities

Practically all instruments designed for the precise measurement of minute electrical quantities operate on the *Wheatstone bridge* principle. The Wheatstone bridge is a device which measures an unknown resistance by comparing it with a known resistance. You might draw a parallel between this and the operation of the familiar beam balance, which measures the force of an unknown weight by balancing it against the force of a known weight.

A sliding contact increases or decreases the known resistance to achieve the same sort of result reached by sliding a weight on a scale beam; namely that the value of the unknown quantity is shown when the instrument comes to balance. If the weight on the beam balance were power driven in such a manner that it moved automatically in the proper direction to restore the scale to balance, the similarity would be complete. This is actually done in the continuous balance *Wheatstone bridge* where the comparative values of the known and unknown resistances determine the direction in which the balancing motor will drive. In order to gain greater speed, accuracy and sensitivity, the unbalance is electronically amplified before it is applied to the balancing motor.

If you take two wires of different materials and weld them together at one end, you have a *thermocouple.* If you then connect the free ends to a voltage measuring device, you have a *pyrometer* which will allow you to measure temperatures. When a difference in temperature exists between the welded ends of the couple (hot junction) and the unwelded ends (cold junction), a voltage is produced which is proportional to this temperature difference. Therefore, after compensating for the ambient or room temperature, this voltage can be measured by an electronic potentiometer-pyrometer which interprets the result in terms of temperature.

The method of voltage measurement here is very similar to that used for the resistance thermometer, except that slight alterations of the circuit are made so that voltages, rather than resistances are balanced.

Multi-Point Instruments

When the electronic instrument is used as a multi-point recorder, extension wires from the thermocouples or resistance bulbs enter the measuring system through a commutator. This connects each measuring element to the instrument in a regular sequence, using a system of numbers, colors, or some other

(Please turn to Page 49)

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Vermont Operators To Meet

The Importance of Milk Quality is the slogan for October 19 and 20, when the Twenty-Eighth Annual Conference for Dairy Plant Operators and Milk Distributors meets at the University of Vermont at Burlington, Vermont.

Men who are interested in all phases of the milk industry attend this conference. Whether they are commercial men, milk sanitarians, milk dealers or managers and operators of milk plants, they come from all the New England States as well as from New York, New Jersey and Pennsylvania.

Professor Alec Bradfield of the Dairy Department of the State Agricultural College is securing speakers to discuss: Milk, Our Finest Food, The Shifting Emphasis on Quality Control, Dairy Sanitation Necessary for Quality Products.

For milk sanitarians there will be papers on: A Mastitis Control Program, Abuses of Milk Trucking Regulations, and The Stream Pollution Problem.

Operators of country milk plants will hear a panel discussion on Butter-fat Losses in Country Milk Plants, A Studied Review of the Babcock Test Method, and a paper entitled Winter Uses for Summer Stored Cream.

•

New York Cow Numbers Are Up

Empire State Reports Two Percent Gain as New England Also Registers Increase

THE NUMBER of milk cows on farms in New York in June 1949 was about 1,346,000 or two percent greater than a year ago, although more than one percent below June in the peak year of 1945. This new June series, first available this summer, relates to milk cows, which includes heifers that have already freshened the first time, according to a federal-state report issued from the New York State Department of Agriculture and Markets, and is therefore somewhat more realistic than the January 1 estimates that have been made for many years, which include all heifers two years old or over, some of which have not freshened.

During the period 1935 to 1949, June cow numbers were 1,249,000 in 1935, rose to a pre-war peak of 1,342,00 in 1941. Receding for two years, cows then increased again to a peak of 1,364,000 in June 1945, declined irregularly to 1,320,000 in 1948 and rose to 1,346,000 in 1949.

Cow numbers tend to move up and down in irregular cycles, averaging about 16 years from peak to peak. Many economic factors affect the rate of change, which is always slow. Most important are the net returns from milk as compared with the possible returns from alternative opportunities that might be available to dairymen.

A nearly parallel movement in cow population has taken place in the North Atlantic States, which include most of the great milk sheds supplying the large urban population of the northeastern states. The 3,175,000 cows currently reported for this group of states is less than one percent more than a year ago and is about two percent less than the peak reached in 1945 and is only six percent more than in 1935. Nationally, the 22,677,000 cows on farms in June 1949 was the smallest number since 1931, was 12 percent below the June 1944 peak and one percent below June 1948.

The cow population in New York was about six percent larger in 1948 than in 1935, while the human population increased nine percent during the same period. At the national level, milk cows decreased by five percent and humans increased by nine percent during the same 13 years.

MIF Los Angeles Program

MONDAY, OCTOBER 24

General Session

9:30 Film: Productivity, Key to Plenty
20th Century Fund and Encyclopedia Britannica
9:45 Address of Welcome
9:50 President's Address
10:20 Announcements and appointment of committees
10:30 Employees are our Associates –
Ariel C. Merrill, Cloverleaf Dairy, Salt Lake City, Utah
11:15 Rediscovering America –
Dr. J. O. Christianson, University of Minnesota, St. Paul, Minn.

TUESDAY, OCTOBER 25

General Session

9:30 Film: Going Places – Harding College, Searcey, Ark.
9:45 America's Milk Overseas –
Grover Turnbow, International Dairy Supply Co., Oakland, Cal.
10:25 Reports of committees and election of directors
10:40 O. H. Hoffman, Jr.
11:20 Europe's Dairying in 1949 –
Leland Spencer, Cornell University, Ithaca, N. Y.

Wednesday Afternoon: Joint Session with International Association of Ice Cream Manufacturers.

Accounting Section

J. M. Forbis, Chairman J. F. Malone, Secretary

Monday, October 24, 1949

2:00 What's New in Route Accounting –
E. B. McClain, Accounting Consultant to M.I.F., Chicago, Ill.
2:45 Internal Audit Methods for Exposing Fraud on Inventory – Merchandise – Pricing – Cash, etc.
Robert S. Warner, Lybrand, Ross Bros., and Montgomery, Los Angeles, Cal.
3:30 The Planning and Buying of Insurance
a. Effective Coverage at Minimum Expense through Proper Coordination
b. Determination of Adequate Coverage for Replacement Cost –
John Gurash, Pacific Employees Insurance Company, 1033 S. Hope St., Los Angeles 15, Cal.

Tuesday, October 25, 1949

2:00 Film: The Magic Touch
2:15 Are Your Figures Always Adequate and Ready?
How to avoid burning the midnight oil when figures are suddenly demanded for: a. Negotiating Producer Prices; b. Negotiating Labor Contracts; c. Public Relations; d. Management Guidance – Guy Sitler, Meadow Gold Dairies, Inc., Pittsburgh, Penn.
2:50 How Do Your Costs Compare With Others? A presentation and analysis of actual costs submitted anonymously by members present –
F. V. Solzan, City Dairy Company, South Bend, Ind.
3:40 Discussion of Cost Problems – a question and answer period

Wednesday, October 26, 1949

9:30 Internal Audit Methods for Exposing Fraud –
Walter Gibson, Lybrand, Ross Bros. and Montgomery, Los Angeles, Cal.

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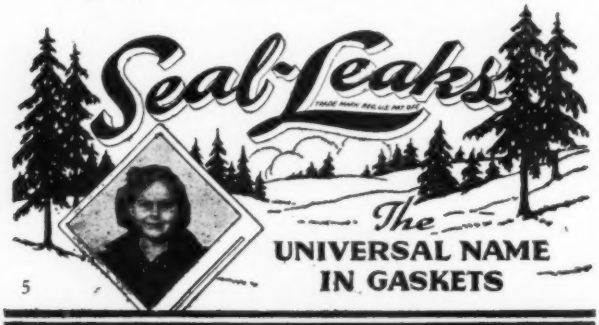

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10:15 Paper and Glass – A Discussion of Costs
A. J. Claxton, Chairman of Container Costs Committee, Meadow Gold Dairies, Inc., Pittsburgh, Pa.

11:00 What steps can be taken to locate fat losses in a milk plant?
R. J. Reese, Adohr Milk Farms, Los Angeles, Cal.

11:45 Reports of Committee; Election of Officers

Laboratory Section

Monday, October 24, 1949

2:00 Current Review of Milk Flavors –
Dr. N. P. Tarassuk, University of California, Davis, Cal.

Joint With Milk Supplies Section

2:40 Insect Control – A Symposium
a. How insecticides affect animal and human health, and methods of detection. –
Robert S. Roe, Food and Drug Administration, Los Angeles, Cal.
b. How to Control Insects with materials now available. –
Dr. James R. Douglas, University of California, Davis, Cal.

3:30 Quaternary and Cleaner Sanitizers in the Dairy Industry
Dr. P. R. Elliker, University of Oregon, Corvallis, Ore.

Tuesday, October 25, 1949

2:00 Correlation and Interpretation Between Sanders-Sager and Scharer Methods for Phosphatase Test –
R. M. Radford, National Dairy Research Laboratory, Oakdale, L. I., N. Y.

Comparative Study of Microscopic Methods and Staining Procedures –
a. Strip Counting
b. Staining Methods
Dr. L. V. Dieter, Los Angeles Health Department

Minimum Laboratory Equipment Needed for Milk Laboratory in Dairy Plant
a. Type and Make of Equipment
b. Space Needed
c. Approximate Cost
d. Personnel needed
Dr. C. W. England, Highland Farms Milk Co., Washington, D. C.

Wednesday, October 26, 1949

9:30 Effect of Bacteriophage on Cultured Milk Products –
Dr. P. R. Elliker, University of Oregon, Corvallis, Ore.

The Effects of Heat Treatment on Physical and Chemical Properties of Dairy Products –
Dr. A. P. Stewart, Golden State Company, Ltd., San Francisco, Cal.

Super Centrifuging of Milk
a. A New Approach to Study of Milk Composition
b. A Possible New Method for Determining Fat in Milk
Dr. T. F. Ford, Bureau of Dairy Industry, Washington, D. C.

Milk Supplies Section

Monday, October 24, 1949

2:00 The Ring Test as an Aid in the Control of Bang's Disease –
Dr. Martin H. Roepke, University of Minnesota, St. Paul, Minn.

2:40 *Joint With Laboratory Section*

Tuesday, October 25, 1949

2:00 Recent Developments in Bulk Handling of Milk in Farm Tanks and Tank Trucks

1. How Bulk Handling Fits Into Company Operations – Howard Ellison, Carnation Company, Los Angeles, Cal.
2. Equipment and Farm Installation – Russell L. Perry, University of California, Davis, Cal.
3. Tank Truck Collection – L. C. Clifton, California Milk Transport Co., Clearwater, Cal.
4. Regulatory and Sanitary Aspects – Mark Howlett, Supervising Dairy Inspector, Los Angeles City Health Department

Wednesday, October 26, 1949

9:30 New Research in Livestock Disease Protection – Dr. Hugh S. Cameron, University of California, Davis, Cal.

10:15 Latest Developments in Pasture Plants and Management Practices – Burle J. Jones, C. M. Volkman & Company, San Francisco, Cal.

11:00 Information Exchange: Fundamentals of Milk Pricing – Mr. Edward O. Mather, Dellwood Dairy Co., Inc., Yonkers, N. Y.
Dr. C. A. Brown, Borden's Southern Dairy Products, Inc., New Orleans, La.
W. C. Weldon, H. P. Hood & Sons, Inc., Boston, Mass.
Mr. Herbert Forest, Production and Marketing Admin., U. S. Department of Agriculture, Washington, D. C.

Plant Section

Monday, October 24, 1949

2:05 Operating Dairy Fleets
- a. Operating Practices – Ed. Schultz, Abbotts Dairies, Inc., Philadelphia, Pa.
- b. Preventive Maintenance – Louis P. Erickson, Adohr Milk Farms, Los Angeles, Cal.
- c. Some Principles of Economical Truck Operation Gathered from Industrial Surveys – Wm. Eldridge, Booz, Allen, and Hamilton, Los Angeles, Cal.

3:20 Water Softening in Dairy Plants – Lock A. Piatt, Elgin Softener Corp., Yuma, Ariz.

Tuesday, October 25, 1949

2:30 Loading and Unloading of Routes –
- a. Palletizing
- b. Methods of Checking Routes G. H. Brockmeyer, Arden Farms Company, Los Angeles, Cal.

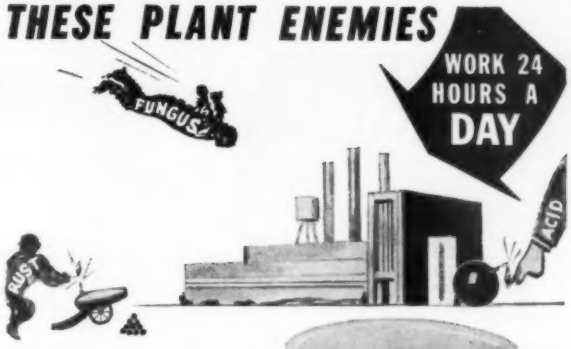
3:00 Cottage Cheese
- a. Problems in Manufacture and Packaging – Edward Kenealy, Borden Co., Pacific Cheese Div., Oakland, Cal.
- b. Recent Developments in the use of non-fat milk solids – J. F. Duncan, Golden State Co., San Francisco, Cal.
- c. Utilization of Whey – T. V. Marquis, Western Condensing Co., San Francisco, Cal.

Wednesday, October 26, 1949

9:30 Business Meeting

9:45 How to Control Plant Costs with Proper Employee Education
1. A Training Program
   a. Employee Relations; b. Work Simplification; c. Supervisor Training –

THESE PLANT ENEMIES



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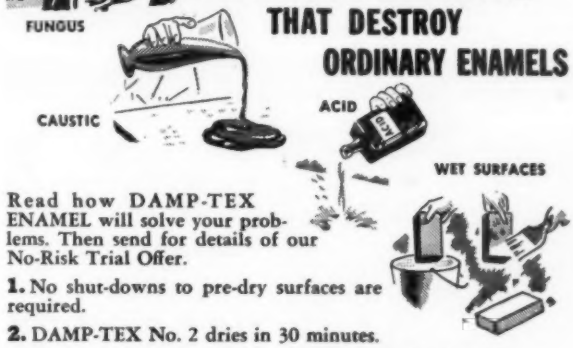

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Owen M. Paddock, Bowman Dairy Company, Chicago, Ill.

2. Suggested Award Systems and Safety in Plants
3. Maintenance of Dairy Equipment — D. W. Morse, Golden State Co., Ltd., Los Angeles, Cal.
4. Good Housekeeping Pays Dividends — Walter Ahlstrom, Carnation Company, Los Angeles, Cal.

Sales and Advertising Section

Monday, October 24, 1949

2:05 California's Public Relations Program of Determining Milk Costs and Profits, and Selling Their Reasonableness to the Public
- a. A Practical Method of Analyzing Costs and Profits — W. B. Woodburn, Department of Agriculture, Sacramento, Cal.
- b. How the California Dairy Industry Presents these Costs to the Public Richard Werner, California Dairy Industry Advisory Board, Sacramento 14, Cal.
- c. How We Tell Our Customers About the Value of Milk

3:20 Information Exchange: How to Cut Down Costs of Sales and Delivery
- a. Three-day per week delivery
- b. Glass vs. Paper
- c. How many routes per supervisor
- d. How many points per route
- e. How many deliveries per hour
- f. How to control returns
- g. Universal Bottle
  W. B. Woodburn, Department of Agriculture, Sacramento, Cal.
  Arthur C. Wiesenberger, Carnation Company, Los Angeles, Cal.
  L. T. Wells, Foremost Dairies, Inc., Atlanta, Ga.
  C. W. Hunt, Milk Foundation of Indianapolis

Tuesday, October 25, 1949

2:00 Film: The School that learned to Eat

2:20 Are Americans Gambling With Their Health? Julia Kiene, Westinghouse Electric Corp., Pittsburgh, Pa., and Dr. Pauline Beery Mack, Pennsylvania State College

3:00 The Need to Get Out and Sell — Clarence L. Malan, Carnation Co., Oakland, Cal.

3:45 Information Exchange: Are By-Products Actually Profitable?
- a. What By-products should be handled
- b. How does the West Coast sell so much cheese
- c. Does certified milk build a business
- d. Which products are profitable on retail routes
- e. How to promote buttermilk sales
- f. How can we regain cream sales
  H. S. Wakefield, Adohr Milk Farms, Los Angeles, Cal.
  C. Ray Brock, Brock-Hall Dairy Co., New Haven, Conn.
  Harold R. Orme, Meadow Gold Dairies of California, Pasadena, Cal.

Wednesday, October 26, 1949

9:30 Film: It's Your Health

9:45 Safety in Sales — E. G. Quesnel, The Borden Co., New York, N. Y.

10:30 How Restaurants Can Use Cream More Profitably — C. O. Manspeaker, Western Avenue Cafeteria, Los Angeles, Cal.

11:00 Information Exchange: How to Build a Well-Rounded Advertising Program

a. Figuring the Advertising Budget
b. What media are most effective
c. What colors should be used
d. What about television
e. Should we emphasize company name or product name

E. L. Volkwein, Foremost Dairies, Inc., Jacksonville, Fla.
R. A. Burns, Whiting Milk Co., Boston, Mass.
W. H. Renter, Golden State Co., Ltd., Los Angeles, Cal.
Walter Mayer, Carnation Co., Los Angeles, Cal.

Selling Slants

Attractive Appearance Is a *Must* for the Salesman

***By* FRANK W. GREY**

FIRST IMPRESSIONS may be regarded as superficial, yet they are often the *deciding* impressions. This is as true of men as it is of products. It is particularly important for the salesman to make good first impressions, and personal appearance has a great deal to do with it. No amount of sincere effort or magnetic personality can entirely overcome the effect of unsightly appearance.

Women have known this for centuries. They are highly conscious of first impressions, and therefore are usually fastidious about the details of makeup, clothing, and adornment. Look at the tremendous volume of business done by the cosmetic industry, by the beauty parlors around the corner from everywhere, by the women's garment industry. Don't charge it all up to vanity – women know the value of eye-appeal.

Attractive appearance does not necessarily mean expensive or flashy clothes. Quite the contrary – a man looks best when he is dressed appropriately for the work he is doing. What it does mean is attention to a lot of details which are often overlooked.

Cleanliness is of first importance. Clean blue denims or khaki are more attractive than soiled broadcloth, and are the natural garb for a man doing manual work. A trim haircut, a clean shave, well-brushed teeth, polished shoes, finger nails that bear no bands of mourning – these are the little things that don't cost much, take only a little extra effort, and make a man look better, feel better, sell better.

Look at it in terms of products. Merchandise in soiled packages may sell, but not as well. Business firms have spent millions in designing and redesigning packages to make them catch the eye, stimulate buying interest, reflect the quality of the product. The principle of eye-appeal in merchandise applies with equal importance to the men who are selling it.

Attention to the details of good appearance has an effect on a man psychologically, as well as on everyone whom he meets. If he looks successful, he is bound to feel successful, and that goes a long way toward *being successful*.

Take a look at yourself in the mirror every morning before you go out on the job. Ask yourself whether the man you see in the mirror is the type who could command *your* respect, sell *you* a bill of goods. If the answer is "yes" you are on your way to a profitable day.

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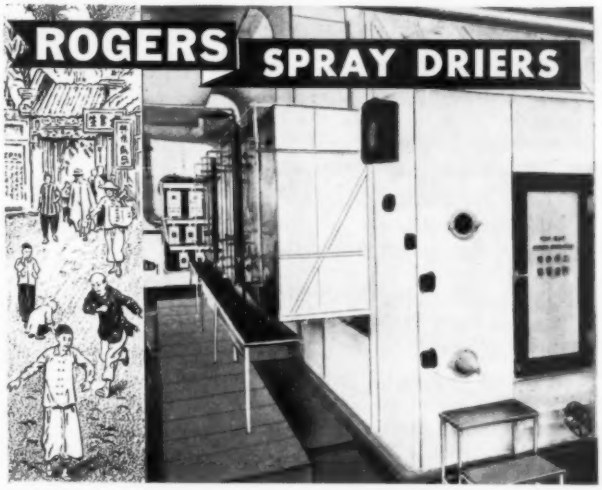

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Standards Have To Grow

By F. A. FAUST

The Bristol Company

Out of the cooperative effort of many men and many organizations have come the standards of temperature measurement and control so vital to the dairy industry. This is the story of the patient, careful work done by DISA's Task Committee on Thermometers and Controllers in helping to establish these standards.

TO THE INDUSTRIAL instrument manufacturer temperature is the most important measurement in dairy processing. It is significant therefore, that in the development of various temperature measuring scales, someone suggested a scale with the freezing point of water as the low point and the melting point of butter as the high.

In this article I am going to try to recount the high spots of the part that the Dairy Industries Supply Association, through its various committees, has played in the development of temperature measuring and controlling devices for use in the dairy industry.

Since present day effort is toward building instruments that meet the so-called 3A Standards it seems desirable to make some attempt to define 3A. 3A Standards are in reality the results of coordinated effort on the part of three associations originally identified as:

1. The International Association of Milk Sanitarians.
2. The International Association of Milk Dealers.
3. The Dairy and Ice Cream Machinery and Supplies Association.

Cooperation of these three associations took on serious form in 1937 and was the ultimate result of suggestions made in 1933 at the Annual Meeting of the International Association of Dairy and Milk Inspectors. In 1935 the Technical Committee of DISA came into being and the success of this committee has been, in large part, due to the leadership of the men functioning as chairmen. These men are as follows:

Loomis Burrell—1935-1936

C. E. Mortensen—1937 (deceased)

G. W. Putnam—1938-1944, Chairman; 1945 to present, Co-Chairman

H. L. Miller—1945-1946, Co-Chairman

H. S. Fielder—1945, Co-Chairman; 1946 to present, Chairman

R. N. Smith—1947-1948, Co-Chairman (deceased April, 1948)

N. J. Peters—1948 to present, Co-Chairman (replacing R. N. Smith)

W. D. Jordan—1948 to present, Co-Chairman

Personal contact leads me to say that most of the above men have been intensely interested both in the application of temperature measuring devices to dairy processes and in the improvement of these devices. The late Mr. Mortensen, although the active head of a dairy equipment manufacturing company, was especially helpful in the development of electric control equipment. George Putnam was particularly well prepared for 3A cooperative work. He received fundamental training in health work under Dr. Herman Bundesen in Chicago and later joined the Creamery Package Manufacturing Company, assisting the late J. H. Godfrey. Incidentally Mr. Godfrey also helped greatly in the development of electric control and was awarded a patent on a method of controlling a continuous heat exchanger. I remember George Putnam as a prodigious worker. At one time we were installing a piece of heating equipment at the Bowman Dairy in Chicago, and worked impatiently long into the night as pipe fitters until a union decree stopped us. It was an outstanding case of where a union actually stopped a man who was perfectly willing to work and made him become an executive. Howard Fielder was awarded a patent on a method of controlling a batch pasteurizer which today continues to be an outstanding contribution to the art of temperature control. The varied contributions of Loomis Burrell and H. L. Miller to the dairy industry are so well known as to require no further elaboration.

The original collaborators in the 3A Sanitary Standards program have since either changed their names slightly or have been replaced. Today the work of formulating standards is carried on by:

1. The Sanitary Standards Subcommittee of the Dairy Industry Committee
2. The International Association of Milk and Food Sanitarians
3. The United States Public Health Service
4. Dairy Industries Supply Association

The Dairy Industry Committee is made up of representatives of the following associations:

American Butter Institute
National Cheese Institute
Evaporated Milk Association
American Dry Milk Institute
Milk Industry Foundation

International Association of Ice Cream Manufacturers

The Sanitary Standards Subcommittee of DIC assigns projects to the task committees of DISA's Technical Committee, among others, and in this manner the Task Committee on Thermometers and Controllers has its work assigned.

The first chairman of the Thermometers and Controllers Committee was Ray E. Olson. It is my recollection that the other members of the first committee were George Putnam, C. B. Dalzell, Schuyler Goodwin, E. E. Corbett, Ross Perkins and F. A. Faust. Several changes have been made since this first committee was established. At present the writer is Chairman, Ray Olson having advanced to the presidency of DISA. The present personnel includes:

F. A. Faust—Bristol Co.—Chairman

Rudolph Beck—Manning, Maxwell & Moore, Inc.

C. B. Dalzell—Cherry-Burrell Corporation

Otto Etterwendt—C. J. Tagliabue Corporation (N. J.)

G. E. Heller—Taylor Instrument Co.'s

R. N. Perkins—The Foxboro Co.

This is not exactly a committee of youngsters; for example Charlie Dalzell was co-inventor, along with the late Harvey Feldmeier, of the D. H. Burrell Long Flow Pasteurizing Holder, first built in 1909.

The work of the Thermometer Task Committee has been chiefly in connection with thermometer bulbs and has brought about designs which have eliminated any threaded constructions in parts which might come in contact with milk.

I am not illustrating this article for several reasons. If I showed only my own company's equipment it would be criticized by other members of the committee. If I showed some other company's equipment I would be criticized by those of my associates who have been slighted and particularly by my own sales promotion colleagues, and if I showed equipment of all manufacturers it would take too much space.

Naturally the original attempts to change thermometer bulb construction were not too warmly received by the instrument manufacturers. They had arrived at a design which permitted great interchangeability by the use of various adapter fittings. But it had its shortcoming in that it included threads which might come in contact with the milk and which could become very unsanitary if not cleaned daily. The bulbs were provided with wrenches for daily dismantling of the adapter parts but this daily dismantling was an objectionable extra task for dairy personnel and many times was neglected. When neglected the result was an overpowering stench. The health officers readily won their point by actual demonstration of this offending equipment.

Standardization along the 3A sanitary lines has resulted in the following bulb designations:

3A1 and 3A2 for side wall connection
3A3—umbrella flange for top connection
3A4—for sanitary pipe lines
3A5-3A6—dual ferrule arrangement for 3" and 4" pipe lines and intended for HTST pasteurizing systems.

Work has been done on an homogenizer flange, cold milk recorder specifications, and a storage tank socket with further study being devoted to a blister bulb construction for a storage tank controllers and completion of specifications for HTST pasteurizers. We intend to continue investigations into thermal timing methods of holder time on HTST pasteurizers.

The results obtained thus far by the various collaborating agencies is due in no small part to the diplomacy and patience of health officers. I would mention particularly the late Leslie Frank who headed the department of milk investigations in the U. S. Public Health Service, and his successor, A. W. Fuchs. They have never asked for the impossible or impractical. I recall a time when Mr. Frank invited a number of thermometer manufacturers to a conference with the idea of specifying a response test for thermal limit controllers. He suggested a figure of five seconds to pass through a certain temperature range and we were all rather pessimistic about the possibility of its being accomplished until he said, "Gentlemen, I know it can be done because I made the test in less than four seconds with a thermal system manufactured by one of you". We quickly agreed that five seconds would not be too difficult.

I would also like to commend the several local health officers with whom I make contact, particularly the New York City representative, and W. D. Tiedeman, and Clarence Weber of the New York State Department of Health.

All through the 3A activities DISA has been a most helpful contributor as an arranging and coordinating factor. When the war came along a war problems committee was formed and DISA moved its headquarters to Washington. Prior to that time there were instrument specialists connected with the OPM but when one asked for information about instruments he was usually asked if he was interested in brasses or woodwinds. That condition was corrected after DISA established offices in Washington. There was a constant flow of helpful information available through the Confidential DISA Bulletin and DISA's Washington Bulletin.

The method of operation of the agencies which bring about 3A sanitary standards formulation might well serve as a model for general activity in solving problems of political and economic cooperation. Here we have suggestions and codes formulated on a national level with administration and enforcement at the town pump level, and I use the words "town pump" as symbolic of local government and not as a piece of dairy apparatus.

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3 Non-Mechanical Built-in Agitation
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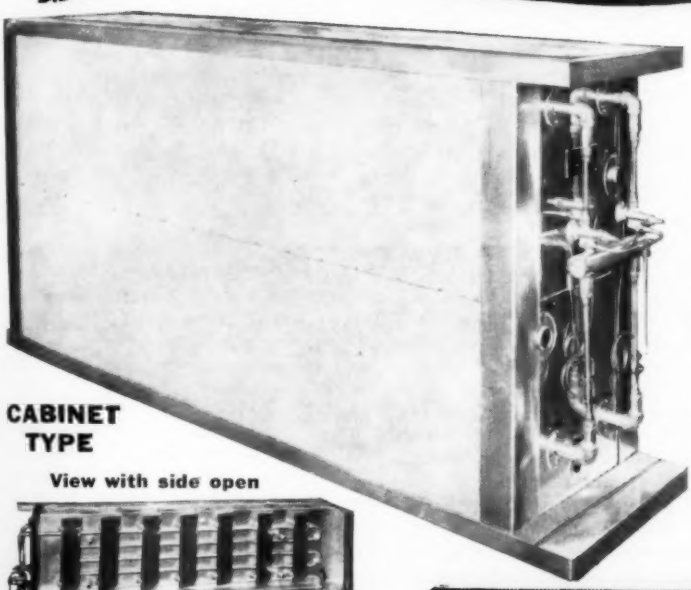
Write for Bulletin No. 95.



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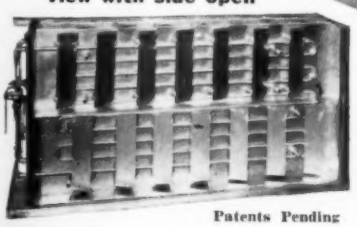


Patents Pending

THE KING ZEERO COMPANY
1447-55 Montrose Ave. Chicago 13, Ill.

FREDERICK A. FAUST

THE MOST COMMON QUESTION that harried railroad officials must answer during the summer is the query, "Is that daylight or standard?" The question serves as sharp reminder of the supreme importance of common standards in human relationships. We have only to look at our own dairy industry where variations in local health requirements have created a major problem for the industry. To the instrument manufacturer particularly is some common agreement on what constitutes a standard of measurement and a standard of performance in processing milk a necessity.

Frederick A. Faust, graduate of Penn State in the class of 1917, veteran of the first World War, and a research engineer of no little stature has devoted a large part of his life to the development of standards for instrumentation in the industry. For the past ten years he has served on the Technical sub-committee of the Dairy Industry Supply Association that deals with thermometers and controllers. Now the chairman of the sub-committee, he has carried on his work in company of such outstanding figures as Joseph Willman, the late J. H. Godfrey, and C. E. Mortenson. Cooperative action with the International Association of Milk Sanitarians, the International Association of Milk Dealers, and what was then known as the Dairy and Ice Cream Machinery Supplier's Association, resulted in the establishment of the 3A standards for dairy instruments. A large share of the credit for the achievement of this cooperative effort must go to Mr. Faust.

Since 1925 Mr. Faust has been on the staff of The Bristol Company in Waterbury, Connecticut, as a research engineer. He has been intimately associated with dairy industry problems involving instrumentation and automatic control since 1929. Half a dozen patents in this field are credited to him.

So close has been Mr. Faust's connection with the dairy industry that the association has had its influence on his avocation. When not designing instruments or developing standards he is well occupied with his own herd of Ayrshires in Woodbury, Connecticut.

THESE MEN HAVE MADE

The Ultimate Guarantee on Any Product

RAYMOND E. OLSON

MOST PEOPLE find it impossible to enjoy the monuments that are erected in their honor. Raymond E. Olson, Vice-president of the Taylor Instrument Companies, is unique to this respect. For if ever there was a monument to the industry and vision of a single individual it is in the shining steel and beautiful mechanism of the Flow Diversion Valve which Mr. Olson brought to its present state of efficient perfection.

Mr. Olson joined the Taylor Instrument Companies soon after his graduation from the Rochester Institute of Technology. After gaining some sales experience he was transferred to the sales engineering Department. In 1927 he took over the management of the department and, surrounding himself with a staff of competent engineers, embarked upon two decades of work in the field of dairy instrumentation.

His deep interest in the dairy industry dates back to 1926 when he was granted the first of his twenty-three patents, thirteen of which are in the dairy field. Among the most important of his many contributions are two worthy of special note. The first was the perfection of the Flow Diversion Valve already mentioned which makes possible today's High Temperature Short Time Pasteurization. The other is the work he did through the Dairy Industry Supply Association on the standardization of thermometer fittings to insure interchangeability and adaptability to various types of milk processing equipment.

As a member of DISA he has served as chairman of its sub-committee on Thermometers and Controls; a member of its sub-committee on Sanitary Regulations; a member of the Technical Committee, a Director and now President. In this latter capacity he is serving his second term in office.

TOM HARRISON, SR., is a Virginian. They are distinguished names, those, Harrison and Virginia. Both have given much to the Republic and both have flourished in the nation that they helped to create.

Mr. Harrison is Technical Advisor to the Brown Instrument Division of the Minneapolis-Honeywell Regulator Company. He is an Electrical Engineer by profession endowed with a flair for seeking out the new and the better that has resulted in more than one hundred United States patents having been issued in his name. The list includes such devices as electric and mechanical flow meters, mechanical and electric potentiometers, radiation pyrometers, and air and electrical controllers.

One of Mr. Harrison's great contributions to the dairy industry has been his work in the application of modern electronics to the field of temperature measurements. The practical result of this work has been the development of an electronic potentiometer. This is a device that is primarily designed to measure small variations in electrical quantities. It can be used to indicate, record and control any variable that can be converted into electrical terms. Temperature, pressure, flow, weight, pH, and causticity are some of the items that can be handled by the potentiometer.

To most dairymen, more familiar with blend prices and butterfat differentials than with frequency vibrations, the final expression of the amazing field in which Mr. Harrison has done his work lies in the official description of one of his creations. It is, according to the records, "a self-balancing potentiometer with a reversing motor for rebalancing . . . the energization of the motor being proportional to the unbalance".

What the future holds for electronic measurement and control in the dairy industry is a job for the crystal ball. Down at Brown Instrument if you ask them for the answer they shrug their shoulders and say "Heaven only knows. Heaven, and maybe Harrison, that is."

TOM HARRISON, SR.

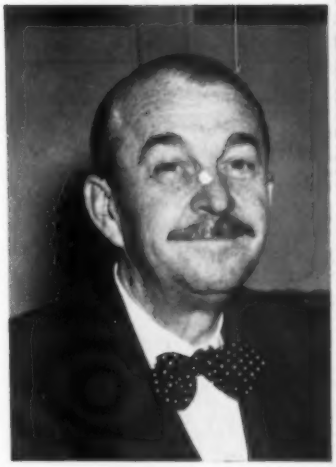
INSTRUMENT HISTORY

Is the Integrity of the Men Who Build It.

ALONG THE BANKS of the rocky streams that cleave New England's molded hills the crumbling masonry of a thousand dams lies hidden in the brush. They are all that remain of a brief era that saw the tumbling white water of hill country brooks harnessed to turn the wheels of countless small industries. Scythe snaths and baby carriages, coffins and corn brooms, axe handles and butter firkins made their way from the tiny factories to the four corners of the world.

The small dams were replaced by larger works. There was power along the Connecticut and the Housatonic, along the Androscoggin and the Penobscot Villages grew into cities whose names became synonymous with shoes, blankets, paper, and rifles. You've heard of the names, Brockton, Lawrence, Rumford, Holyoke, Springfield. The physical characteristics changed but the fundamentals remained. The spirit that could meet a hard, uncompromising land and turn it into a symphony of turning wheels and fine craftsmanship, the stubborn will that refused to be anything but the master of its own destiny, that spirit remained.

Ross Perkins is a product of New England. He is in charge of the sale of instruments to the food industries for The Foxboro Company. His patents on instruments used in this industry reflect the restless Yankee urge to do something better and do it cheaper than it was done before. Like his contemporaries he has contributed to the development of his industry and to the dairy industry through his work on the DISA Task Committee on Thermometers and Controllers and the International Association of Milk and Food Sanitarians. But more than his patents, more than his sales ability, more than his association work the thing that Mr. Perkins stands for is the concept that in the unfettered activity of the mind and hand of free men is the ultimate expression of the dignity of man.



ROSS PERKINS

DR. ROBERT F. HOLLAND

Problems of the Industry

DR. JAMES C. WHITE

Dr. Robert F. Holland and Dr. James C. White, both of the Department of Dairy Industry at Cornell University, conduct their question and answer column each month in the "Review". Questions should be addressed to either Dr. White or Dr. Holland, Department of Dairy Industry, Stocking Hall, Cornell University, Ithaca, N. Y.

●

Cold Milk Separators

QUESTION—We have been hearing about the separation of cold milk and would like to know more about it. Will the cream be better than when the milk is heated? Will the fat losses be greater? Give us the advantages and disadvantages if possible. Thank you.

G. M. H., Pennsylvania

ANSWER—In a competitive cream market dealers are always striving to produce a product with the heaviest possible body. It is a well known fact that under normal conditions, the lower the temperature of separation, the better the body of the cream will be. It is also well known that at these lower separation temperatures, such as 40° - 60°F., the fat losses in the skim milk become greater. In other words, the ordinary separator will not skim clean under these conditions.

In recent months, however, at least one of the major separator manufacturing companies has put on the market a machine designed for separating milk at temperatures as low as 40°F. The separator is air-tight and is designed for use in the smaller plants. The highest capacity available is about 5000 pounds of milk per hour. The machine is of standard design except for the bowl, which is specially constructed to prevent plugging with the cold cream. It is claimed that cream with a fat test as low as 23 per cent can be produced and that the skim will not contain more than 0.01 per cent fat by the Babcock test.

In case it is desired to use these bowls for separation of warm milk the capacities will about double, but runs cannot be so long since there is less room for sediment in them than in standard bowls.

It should be possible to produce cream of the finest body and viscosity with these machines and the expense of heating and cooling milk and cream can be markedly reduced. The new machines should prove highly advantageous to the small plant operator.

Testing Homogenized Milk

QUESTION—Can an accurate test be made on homogenized milk? We have been running 4% on ours, but after it is homogenized we get only a 3.8% test.

S. D., Ohio

ANSWER—Homogenized milk can be tested accurately when modified Babcock procedures are used. The method proposed by Lucas and Trout (Journal of Dairy Science, Feb., 1947, pages 95-102) seems to be simplest and most satisfactory. On comparing 36 samples of milk, homogenized and unhomogenized, by their modification of the Babcock test and the Mojonnier test, the recognized standard of accuracy, they found the homogenized and unhomogenized samples to agree almost exactly. For all practical purposes their method gives results identical for the normal and processed milks.

The method is as follows:

1. Temper the milk to 70°F.
2. Use 17.5 ml of sulfuric acid of 1.83 to 1.835 sp. gr.
3. Add the acid in three portions: 8, 5, and 4.5 ml respectively.
4. Mix the acid and milk by a rotary motion after each addition and continue agitation for at least 15 seconds before adding the next increment of sulfuric acid. Shake the sample at least 2 minutes after the last addition and before centrifuging.
5. Centrifuge and add water in accordance with the regular Babcock procedure.

A solution of water and alcohol (1.4 to 1 by weight) may be used in place of the last addition of hot water. Its use reduces the danger of charring but is not usually necessary.

ARE YOU MAKING MONEY?

If you have any question about it better read Jim Kluger's exclusive accounting page which begins in the "*American Milk Review*" in November. Mr. Kluger, a partner in the accounting firm of Kapleau, Kluger & Co., Philadelphia, will discuss specific accounting problems connected with the dairy industry. Questions should be directed to Mr. M. J. Kluger, Kapleau, Kluger & Co., 1414 South Penn Square, Philadelphia, Pa.

Farm Income is Down

New Brunswick, N. J., Sept. 1—The net income which the average New Jersey dairyman will receive for his work in 1949 will be about one-third lower than last year, according to estimates made by John W. Carncross, agricultural economist at Rutgers University.

Carncross attributes this sharp drop in dairymen's net returns to the sharp decline in the price of milk this year, continued high cost for many items used for producing milk, and to increased amounts of feed required during the period of drought.

He pointed out that the 21 per cent drop in the price of milk received by farmers from January to May of this year was the greatest seasonal drop between these two months for any year since 1932. While milk prices recovered some in July, they were still 15 per cent under this year's January price.

Costs at High Level

"Farmers' costs in dairy farming have continued at a high level. It is true tht dairy concentrate feeds in July were 20 per cent lower than they were a year earlier. However, farm machinery prices were 11 per cent higher; fertilizer prices were up 5 per cent; farm real estate taxes were also higher this year than last; farm wage rates are about the same as a year ago but about three times above the prewar average," Carncross said.

"At any one time in a period of declining prices the squeeze from high costs and lower prices received will be greater on some farm products than on others," he declared. "This is all a part of the inescapable change of economic events. We are living in a time when the tempo of competition in all lines of production is increasing. Labor returns from poorly managed farms will be low. Efficient dairy farming is economically sound in New Jersey and will continue, even in adverse times, to reward good management."

●

Can Predict Annual Milk Yield

Breeders of Ayrshire dairy cattle can now determine the annual milk production of their cows, with a maximum margin of error of only eight-tenths of one percent, on the basis of fifty to seventy day milking records.

It is expected that dairy farmers will save untold thousands of dollars every year by the scientific selection of bulls at an early date. The breeding value of bulls, whose blood strains affect milk production as well as the butterfat content in milk, can now be determined more quickly than ever before by the application of this accurate advance data.

This revolutionary development in dairy farming was announced by Henry Mosle, Chairman of the Research Committee of the Ayrshire Breeders' Association. Mr. Mosle, owner of Fair Meadows Farm, Litchfield, Connecticut, made the announcement after the 1949 annual meeting of the Research Committee, at the headquarters of the Ayrshire Breeders' Association in Brandon, Vermont. Other members of the committee are Professor George Hyatt, member of the West Virginia Agricultural College faculty; Dr. E. C. Deubler, noted veterinarian of Newtown, Pennsylvania; Professor V. A. Rice of Massachusetts State College; Professor James Linn, Kansas State College, and Professor Raymond Albrectsen, Cornell University. Dr. W. J. Tyler, research investigator at West Virginia University, participated in the annual meeting, though he is not a committee member.

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PLAIN TALK from a PLAINS STATE

By **JOHN BURNHAM**, *Fargo, North Dakota*

NORTH DAKOTA is a cash crop state, a cereal grain state, a leader in barley, Durum wheat, flax and spring wheat. It has more tractors per farm than any other state. In the war years farmers prospered on a seven-month farming season, in many cases without a head of livestock on the place.

But the other day Herman Joos, Farmers Home Administrator (formerly FSA) in the Jamestown area, talked cold turkey to a group of creamerymen. Herman is president of the North Dakota dairy show, and what he said is significant:

"This romance farming is over, gentlemen. The wartime boom when you could farm without livestock is gone. The 90-day wonders and seven-month farmers must wake up and learn that farming is a 365-day job – with livestock, with milk cows."

Joos, an intent, aggressive and tremendously likable and sincere chap, told these creamerymen that dairying must come back if Dakota farmers ride out the weather and price waves of the future. He pointed out that government loans are predicated on that thesis – ownership of livestock is becoming increasingly requisite for getting loans.

North Dakota bankers are singing the same song. A farm with sizable acreages of wheat and flax is not very impressive unless there are some milk cows on the place, too. Many bankers already are granting loans only to farmers who own and milk cows. In the same manner of reasoning, all loan agencies are emphasizing the need for other types of livestock, too – sheep, hogs, beef cattle, poultry.

●

A STATEWIDE PASTURE and hay committee, operating permanently under sponsorship of the state extension service, railroad agricultural agents and seed houses is spreading the gospel of better forage. Charts showing pasture grass combinations which furnish good pasture all season are distributed throughout the state, and are basis for talks by county agents at community meetings. Haying demonstrations were held all over the state this summer, under sponsorship of this group. Thousands of farmers saw new machinery at work, cutting and putting up hay when it was at its best, and getting it cured and stored without loss of the vitamin-rich carotene leaves and color.

If there is a commentary to be made, it is this:

Here is a state which has reached agricultural peaks in wartime, by large-scale mechanized cash crop farming. Here is a state where farmers *AVERAGED* an income of more than $10,000 per year, while thousands of farms sold off their milk cows and other livestock. Here our dairy cow population dropped in a few years from nearly 700,000 head to around 400,000.

And today in this state every man whose advice on farming or economics is worth hearing is urging a return to livestock, a return to dairying. If any state was emancipated from the teat-jerk chore it was North Dakota. But we couldn't quite make it.

Our soil can't stand it. Our fluctuating wheat prices won't permit it. Our recurring waves of drought years won't allow it. A banker won't lend a dollar on it.

We have to go back to cows. Good cows. Before the war our dual-purpose cows weren't highly productive. Our butterfat yield averaged less than the embarassingly low national average. But that is changing. Our farmers want better cows. Dakota farmers are paying top prices today for big Holsteins out of Minnesota and Wisconsin. Guernseys and Brown Swiss are popular, and the ones our farmers like, and raise, are the best. So our comeback in dairying will be not just a return, but an ascent to new high production levels.

Because the best small grain state in the Union, the tractorest state in the Union, has learned it can't get along without milking cows.

New Wisconsin Standards

TWO YEARS of activity on the part of the Wisconsin Dairy Federation came to full circle in late August when an order establishing minimum standards for milk production, transportation, and processing was signed by Milton H. Button, director of the state department of agriculture.

The new order is designed to prevent the sale of unsanitary milk and cream. Under it, the state for the first time has set up specific sanitation standards to cover milk production on its 165,00 dairy farms. The regulations become effective Nov. 15.

One provision of the order requires that every milk producer have a separate milk house, equipped with cooling tank and utensil and storage facilities, by Nov. 15, 1952. It is estimated that about 75,000 farmers would have to put up new buildings to comply with this provision.

The order also states that after Nov. 15, 1950, all vehicles used to carry milk or cream from producers to any dairy plant must be "enclosed" as protection from extreme temperatures or contamination.

A feature article on the new standards will appear in a coming issue of the American Milk Review.

MILK SALES PLAN BOOMS

With ninety-six per cent of all producers in the Rochester milk market, and eighty-nine per cent in Buffalo definitely signed up to support the program of Milk For Health, Inc., in promoting the northeast's major dairy industry, practically every county in the state and parts of Pennsylvania and Vermont have formed committees to further this important farmer-sponsored organization.

In the Syracuse market, first in the state to adopt a unit of the National Dairy Council under the program, operations are due to begin this week, and services of a full time nutritionist have been engaged.

Most encouraging sign of all is the number of cooperatives who have voted to sign up as a unit, thus avoiding the expensive and time-consuming down-the-road canvass. Several cooperatives are amending by-laws in order to authorize blanket set asides.

●

ELECTRONIC INSTRUMENTS

(Continued from Page 34)

means of identification by which each record can be matched up with the point it represents.

Where no record is needed, you can connect an instrument to any one of a number of points throughout the plant, using a push-button panel to select the point at which you want to read the temperature.

Several important operating advantages are inherent in electronic temperature measuring equipment. In the first place, you can obtain an accuracy of measurement of one eighth of a degree with the resistance thermometer. This means that you can often control a process within a fraction of a degree, which is important in many high-speed operations. Then too, the electronic instrument is hard to break and easy to fix. Knocks, jars or vibration will not throw it off calibration. There is no filling medium to leak out. Over a period of time, it will be necessary to replace tubes and batteries, but these are inexpensive and their replacement requires no special skill.

The thermal system for each thermometer, on the other hand, must be designed for an instrument that is located a definite distance from the point of measurement. In the event of damage, this thermal system must be replaced by an identical system. Since wire connections are used in the electronic instrument, it is possible to locate the measuring element any distance from the recorder. In fact, the sixteen thermocouples connected to a strip-chart recorder can be located anywhere from a few inches to several hundred feet away.

Possibilities of Electronic Instruments

When dealing with the instrument industry in general, and the electronic industry in particular, your safest guide is the old motto, "If you don't see what you want, ask for it". As mentioned previously, the only limit to the things that can be done with electronic instruments is the imagination of the engineers and research men in finding ways to convert things that are to be measured into significant electrical variations, and the amount of money a processor is willing to invest to measure a given variable.

If you are having difficulties in measuring *anything*, or in keeping *any* process variable between certain maximum and minimum limits, call in a representative of any one of the companies making electronic instruments. If they don't already have the answer, they may even now be working to find it. If they are not already working on it, and can be shown that a demand for a device, instrument, or control system exists, every effort will be made to provide you with the post possible solution to your control problem.

BAKER BOX
Greetings

BAKER BOX, the Country's outstanding Milk Case Manufacturer, located in the heart of Massachusetts, extends its welcoming hand clear across the continent to all its friends at the D.I.S.A. Convention in Los Angeles.

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for the production of quality dairy products . . .

Sunbeam
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Powerful motor inside the handle

Here's what authorities say:

National Dairies—*"Clipping udders and flanks is the first step in clean milk production."*

Univ. of Wisconsin—*"Clipping saves time when preparing udders for milking."*

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Leading Health authorities say: "A regular clipping program means more wholesome milk and increased profits for everyone. It is an essential step in the production of quality dairy products." Clipping reduces sediment, lowers bacteria, avoids contamination and helps in the control of lice, ticks, etc., which greatly affect milk production. Encourage this good dairy management practice. Educational helps, circulars, and visual aids are available to help you in your program.

SUNBEAM CORPORATION (formerly Chicago Flexible Shaft Co.)
Dept. 12? 5600 West Roosevelt Road, Chicago 50, Illinois

Colleges Plan Dairy Industry Short Courses For Winter Session

Wide Variety of Studies Available At Nation's Land Grant Schools — Salesmanship, Engineering, Testing Prominent

THE DAIRY BUSINESS promises to break out in a rash of note books and slide rules as the annual crop of short courses at land grant colleges gets underway. Ranging in length from a few days to several months and covering a multitude of valuable subjects the program offers a wide choice to dairymen.

University of Wisconsin

Dairy Short Course during fall semester beginning September 26 and closing December 17.

Students taking this course may take either ice cream making and market milk, or buttermaking and cheesemaking. In addition to these subjects, students will be given instruction in Dairy Arithmetic, Dairy Bacteriology, Dairy Cattle Diseases, Dairy Mechanics, Dairy Sanitation, Marketing Dairy Products, and Milk Composition and Tests.

Since the war we have not been in a position to permit the enrollment of non-resident students. This year, however, it will be possible for a limited number of non-residents to take the course.

University of Massachusetts

January 23-28. Elementary Ice Cream Making. This course is designed for those who have had little previous experience in ice cream making. Testing of ingredients, mix standardization and freezing will be included.

January 30-February 4. Advanced Ice Cream Making. Individuals taking the first ice cream course and those with actual ice cream making experience are qualified for this course. Composition control, factors affecting quality, flavoring, ice cream defects, and efficient processing will be studied.

March 13-18. Milk and Cream Testing. Emphasis will be placed upon performing the Babcock test. Other tests such as acidity, lactometer, phosphatase, chlorine and alkali tests will be included. Milk composition and dairy arithmetic will be discussed.

March 20-25. Milk Plant Operation. The steps involved in the commercial processing of milk will be studied. Attention will be given to the function of each piece of equipment used, and the reason for performing each step. Milk quality, dairy barn scoring, and the manufacture of such by-products as chocolate milk, cultured buttermilk, and cottage cheese will be part of the course.

For detailed information concerning registration and housing, one must write to Director of Short Courses, South College, University of Massachusetts, Amherst, Mass.

University of Illinois

1. Dairy Engineering – Two Classes. Opening Night and Registration – Friday, September 23. Time 4:30 to 6:30; 7:00 to 9:00 P.M.– 16-weeks course. Location – Navy Pier. Tuition – $11.50, due first night. Schedule of meetings shown on attached sheet. Dr. P. H. Tracy is in charge of the course.

2. Dairy Salesmanship – One Class. Opening Night and Registration – Tuesday, September 27. Time – 7:00 to 9:00 P.M.– 16-weeks course. Location – Navy Pier. Tuition – $11.50, due first night. Instructor – Robert Walston, University of Illinois College of Commerce. This course will deal with the basic principles of salesmanship as applied to the dairy industry.

3. Defects in Dairy Products and Their Control – One Class. Opening Night and Registration – Monday, September 26. Time – 7:00 to 9:00 P.M.– 8-weeks course. Tuition – $9.00, due first night. Location – Navy Pier. Instructor – Dr. Harry Pyensen of the University of Illinois Dairy Department. The subject matter to be covered in this course will include defects and control of defects in milk, cream, cottage cheese, cultured milk drinks, cultured cream, chocolate milk, chocolate drinks, ice cream, sherbets and ices, and butter.

These classes will be limited to 30 students each; therefore, we suggest that you fill out the enrollment form below, indicating the number of students from your company who will register for each class, and mail it at once to: *T. H. DEKKER, Extension Specialist, Division of University Extension, Illini Center, La Salle Hotel, Chicago 2, Illinois.* For additional copies of this Bulletin call Wabash 2-1751.

West Virginia University

The Ninth Annual West Virginia University Dairy Short Course will be held at Jackson's Mill January 9-13. The annual meeting of the West Virginia Dairymen's Association will be held in conjunction with the Dairy Short Course.

A "Market Milk Short Course" for plant men will be held at West Virginia University, Morgantown, December 5-9. The course of study will include lecture and laboratory on milk and cream testing, pasteurizing and homogenizing milk and cream, manufacture of cottage cheese, chocolate milk, buttermilk and sour cream. We hope to have Mr. Amick of the State Department of Agriculture here to give an examination for those wanting a state tester's license at the close of the course. *Registration is limited to 16.* The first 16 applications received will automatically fill the class. ($1.50-$2.00 per night) for those not wanting to stay at a hotel.

Montana State College

The 14th Dairy Industry Short Course and dairy products show will be held at Montana State College November 14, 15 and 16 with a number of well known leaders in the industry appearing on the program, Dr. J. A. Nelson, head of dairy industry said recently.

Among the out-of-state speakers will be Dr. E. W. Bird of Iowa State College who will discuss the "Manufacture of Butter from Sour Cream", "Neutralizing the Ice Cream Mix" and "Suggestions of the Chemist to the Ice Cream Industry". Dr. K. G. Weckel of the University of Wisconsin will talk on "Nutritional Significance of Minerals in Milk", "Training Sales Personnel for the Retail Store" and "Aspects of Measuring Extraneous Material in Milk".

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STHT INSTRUMENTATION

(Continued from Page 29)

ment (the most accurate means of measuring temperature in the pasteurizing range). The resistance bulbs are carefully calibrated to the same temperature-resistance curve and matched to within 1/10 degree F. to insure that each bulb reacts in identical fashion to a change in temperature which, in turn, insures an accurate indication of the holding time.

Steam and Brine Control Valves

Both the steam and brine control valves are conventional throttling type pneumatic control valves. They should be of the wide range, V-port type with equal percentage characteristics (equal increments of controller output air pressure change give equal increments of flow change). Experience has shown that these flow characteristics are essential to derive the maximum performance.

without frequent controller adjustment, from an automatic proportioning type controller.

Flow Diversion Valve

No discussion of instrumentation for H.T.S.T. pasteurization is complete without including it.

The valve as shown is in the "diverted" position. The milk flows from the holding tube into the inlet port of the valve, around the bottom of the valve plunger, and out through the diverted flow port. The valve is in the diverted position because the solenoid is de-energized (white and black wires from Pasteurlog de-energized). With the solenoid de-energized the supply air is shut off and air above the diaphragm is exhausted through the solenoid. This permits the spring to expand which in turn forces the push plate, diaphragm, valve stem, and valve plunger up (to positions shown in diagram) so that the valve plunger closes the forward flow port. The leak detector ports are so arranged that any milk leakage by the valve plunger will leak through these ports and warn the operator. This safety feature, required by law, prevents any possibility of improperly pasteurized milk passing through the forward flow port. The roller on the end of the micro-switch arm is at the bottom of the groove in the push plate (as shown) when the valve is in the diverted position. This permits the micro-switch to close the circuit between the yellow and red wires and open the circuit between the yellow and green wires. These wires are wired in series with the milk pump through the Pasteurlog and prevent the milk pump from running unless the Flow Diversion Valve is in the proper position as determined by the temperature measuring system (milk temperature) in the Pasteurlog.

When the milk temperature is at or above the legal pasteurizing temperature, as determined by the Pasteurlog, the solenoid valve (black and white wires) is energized. This permits supply air to pass through the solenoid to the top of the diaphragm. This increased air pressure above the diaphragm forces the diaphragm and push plate down by compressing the spring which in turn moves the valve stem and valve plunger down. When the valve plunger is down the diverted flow port is closed and milk from the holding tube flows through the inlet port, around the top of the valve plunger, and out through the forward flow port. This is the condition for forward flow. When the push plate moves down the roller on the end of the micro-switch arm is forced out of the groove causing the micro-switch contacts to change position. This energizes the circuit between the yellow and green wires and opens the circuit between the yellow and red wires. As mentioned before, these wires are wired in series with the milk pump through the Pasteurlog and prevent the milk pump from running unless the Flow Diversion Valve is in the proper position.

The connecting key in the valve stem is for quick disassembly of the valve for cleaning. Removing the connecting key permits the valve plunger to drop down, due to gravity, closing the diverted flow port and opening the forward flow port. However, it also permits the spring to expand more than normal (more than shown in the diagram). This causes the diaphragm and push plate to move up more than normal, moving the roller on the micro-switch arm out of the groove. This energizes the circuit between the yellow and green wires and opens the circuit between the yellow and red wires, and thus prevents the milk pump from running unless the milk temperature is at or above the legal pasteurizing temperature.

The above has been a brief description of the Pasteurset System and its instrumentation. It is the sincere hope of the author that the reader, as a present or prospective user of H.T.S.T. Pasteurization, will now have a better understanding of pasteurizing instrumentation.

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A stainless steel beauty that enhances the interior of modern Restaurants, Hotels, Clubs and Fountains

Sanitary cans locked against tampering, milk protected against contamination. No paddles, no exposed parts, sealed milk from dairy to you. The Monitor Milk Dispenser is electrically refrigerated and scientifically developed. It is in general use by Restaurants, Clubs, Hotels, and Institutions. A compact attractive dispenser unit that enables you to serve your customers a better tasting glass of milk. You will enjoy more profit from your milk sales and increased purchases The Monitor Way.

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NDC HAS THREEFOLD INCREASE

A. F. Kerckhoff, Peverly Dairy Head, Cites Membership Privileges As Council Opens New Drive — Research Has Paved Way To Many New Markets

CHICAGO – Tell, then sell is the blue chip principle in any sales program. It's the formula that creates the "want" for the product.

The National Dairy Council, through its sales education program, creates consumer desires for butter, cheese, ice cream and milk. Satisfying those wants is the job of industry.

Each year the program of the National Dairy Council is geared to take advantage of every opportunity to serve opinion-forming leaders who influence the eating habits of millions of people. The extent to which these new outlets can be cultivated, and established programs revitalized depends upon funds provided through industry membership to the National Dairy Council.

The dairy industry continues to express greater confidence in NDC's educational, promotional and public relations program. Proof of this lies in the fact that since 1940 industry membership has increased more than 368%. Repeatedly dairy industry leaders acknowledge by letter to NDC their wholehearted belief in NDC's nutrition program in schools, hospitals, medical and dental associations, dietetic organizations, industrial plants and consumer groups. These dairy industry leaders realized people must be shown what's good for them, and at the same time be made aware of the taste-giving qualities of dairy foods. They also know this kind of telling leads the way to more sales and more profits.

The National Dairy Council, in its membership drive October through December, should receive a membership application from every dairy company not now a member. Records show that NDC:

1. Plays an important role in helping to hold the market for dairy foods.
2. Increases the sale of dairy foods.
3. Finds more sales facts through dairy food research.
4. Meets the aggressive competition for the food dollar.

Membership privileges which help you boost your own sales are many. Here are eight that point to bigger profits:

1. Special discount of 25% on all consumer leaflets, charts, store and fountain displays, truck and bus cards, movie films and other advertising helps. These are produced in volume and sold on a non-profit basis.
2. Regular mailings of numerous bulletins covering new developments in dairy product research and nutrition information. For this service there is no cost to members.
3. Special ideas and low cost rental service on animated and illuminated displays for fairs, shows, conventions, and numerous other similar events.
4. Different dairy food booklets, charts, posters available to NDC members for reference use by advertising managers and agencies. There is no cost to members for single selected copies.
5. Publicity releases on tested recipes and new ideas for serving dairy foods in the home. These are sent on request at no cost to members. In addition there are news releases based on new findings in the NDC research program.
6. A new photograph service offering the selection of dairy food subjects at low cost for use in house organs, advertising and publicity.
7. Radio, newspaper, and billboard advertising suggestions and helps.
8. Special information at any time on nutrition and market trends in the food field at no cost to members.

Under the direction of the National Dairy Council, fourteen major research projects on nutritional phases of dairy products are in progress in top ranking colleges and universities in the United States.

These are plus services of NDC. In addition, for the small membership dues, you enable NDC to expand its nationally recognized dairy foods promotional and public relations programs with leaders who stimulate the buying impulse of Mr. and Mrs. Consumer.

I urge every non-member of the National Dairy Council to write today for more information on how to profit through an NDC membership. The address is 111 N. Canal Street, Chicago 6, Illinois.

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New Angle in Saginaw

As the nucleus of what its founders envision as a major factor in Saginaw (Mich.) Valley milk distribution, Creamline Dairy has incorporated with authorized $75,000 capital. Its aim is grouping of relatively small milk distributors into a major unit with a central production and processing plant, but with each of the distributors continuing service of its own routes.

Creamline Dairy, owned by Clayton Brown and Emmet Riley, and Trinklein Dairy of Frankenmuth, owned by Melvin

Trinklein and Raymond Weiss, make up the present membership of the new company. The corporation is set up so other distributors may join the Creamline group, and officers say at least four others are expected to join soon. A distributor may join the group by purchase of five shares of $1 par stock for each quart of milk to be taken daily from the processing center. Ownership of the common stock is limited to 4,000 shares, representing 800 quarts daily. If a group member expands beyond the 800 quart level, he must cover the excess by purchase of 6 per cent preferred shares. Capitalization is $25,000 in preferred and $50,000 in common.

Officers of the new company are: Clayton Brown, president; Melvin Trinklein, vice president; Emmet Riley, secretary, Raymond Weiss, treasurer. The fifth member of the board of directors is John H. Stewart, Detroit, official of the Twin Pines Dairies there.

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Pasteurization Law for Wisconsin

Assembly bill No. 715-A has been signed by Governor Oscar Rennebohm of Wisconsin, making it a state law relating to the pasteurization of milk and the licensing of dealers in milk and milk products. In part, the new bill reads as follows: "The purpose of this section of the bill is to insure the wholesomeness and safety of milk, cream and other milk products in fluid form for human consumption, by requiring a license and pasteurization as provided in this section.

"As used in this section, unless the context otherwise requires, 'consumers' milk' includes any milk, cream, flavored milk, homogenized milk, vitamin fortified milk, skim milk, buttermilk, cultured buttermilk or other milk products sold for use or consumption in fluid form.

"No person shall sell consumers' milk in this state after July 1, 1949, without obtaining a license as required by section 97.04. A license shall be required for each conveyance, depot or store receiving milk entirely from a Wisconsin licensed dairy plant or dealer.

"Licenses for the sale of milk shall be issued to the owner of the conveyance, depot or store upon payment of a fee of $5 for each such conveyance, depot or store. Such license shall be prima facie evidence of such ownership and shall not be transferred or assigned.

"No person shall sell or deliver consumers' milk in this state after January 1, 1950, unless such milk is pasteurized or the fluid milk product is made from pasteurized milk, except that this subsection shall not apply to:

"(a) Certified milk and fluid milk products made therefrom, produced entirely from an accredited herd.

"The Department after public hearing by order may postpone the effective date of subsection above for a period of not more than one year, if it is found that the industry generally is not able to procure the equipment necessary to pasteurize milk on a commercial basis.

"This section shall not apply to the business of any producer who sells milk only to patrons who come to the place where the milk is produced and there purchase and receive milk for their own consumption provided that such herd has been tested and found free from tuberculosis and Brucellosis.

"Any person, firm, association or corporation violating any of the provisions of this section shall be deemed guilty of a misdemeanor and punished by a fine of not less than $25 nor more than $100, or by imprisonment in the county jail for a period of not more than 90 days, or by both such fine and imprisonment."

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SINCE 1901

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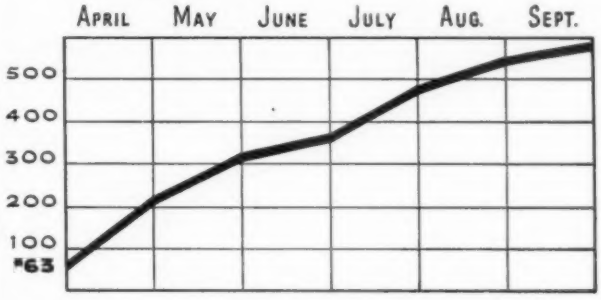

**This figure from the record of a West Coast Dairy (name on request) indicates its total store distribution of combined milk and Yami Yogurt at the start of the 6-months' period shown in the sales-curve.*

Yami Yogurt is a great "door opener" in winning new retail outlets for milk sales. And don't forget that, on its own, it's a great profit-performer as a dairy specialty. Write for franchise details: Yami Yogurt Products, Inc., 8377 Melrose Avenue, Los Angeles 46, Calif.

Kullman Sees Adult Group As Huge Potential Market

Milk Industry Foundation Head Urges Support for National Dairy Council as First Step in Developing Neglected Field

CHICAGO—To meet the nutrition requirements of American consumers it will be necessary to increase the national consumption of milk and its products by nearly 50 per cent.

Nationally recognized authorities have claimed repeatedly that more milk and its products must be consumed to bring America's health standard above the safety line. Greatest gains in the consumption of milk during the past years have been made largely by children. The most extensive market for increased milk consumption is in the adult age group which comprises two-thirds of the population, but now consumes considerably less than a pint of milk a day.

Dairy foods and their various products serve mankind from the cradle to the grave. Nutritionally, they are protective foods. Nutrition research has established the goal of a quart or more of milk for children every day and nearly that amount for adults. With the 1948 per capita consumption of milk .49 quarts daily, the dairy industry is faced with a huge market in which to make more sales and profits to meet the one-quart level of human consumption.

"This deficit in protective food consumption," stated Francis H. Kullman, Jr., Vice President, Bowman Dairy Company, Chicago, and President of the Milk Industry Foundation, "can be eliminated only through a broad, intelligent, effective nutrition education program. This will result in a better nourished people and, in turn, a more prosperous dairy industry."

Mr. Kullman, a nationally recognized leader in the dairy industry, has for many years lauded the contribution of the National Dairy Council in its program of opening new markets and finding new outlets for products through nutrition research, financed by the industry.

"Let's look at one study for a moment —that of aging as a problem of nutrition," stated Mr. Kullman. "This work has been going on at Michigan State College, East Lansing, for several years and results to date show that older persons need more calcium, than previously assumed, to maintain calcium balance. The study clearly reveals the importance of milk for people growing older and opens the door to a vast new market for the dairy industry.

New Market Opens Up

"Even today," declared Mr. Kullman, "it is generally believed that as soon as one reaches a certain stage in life it is somewhat sissy to continue drinking milk. The tables are turning, for we are discovering it is about as important now for an adult to drink a quart of milk as it is for a youngster. With that viewpoint projected by nutrition authorities, a new market running into millions of dollars a year is knocking at our door."

But the nutrition study on adult needs of milk is not the only piece of research opening up new markets. About twenty other studies, under the direction of NDC, financed by the dairy industry, are in progress in top-ranking colleges and universities in the country. In almost every case, findings from these studies will enlarge the market for dairy foods.

Take, for instance, the research carried on by Dr. Janice M. Smith at the University of Illinois in connection with the calcium requirements of teen-agers, a group comprising about one-third of the population. This work shows that such youngsters should have more than a quart of milk daily. Records indicate that they consume considerably under that amount at the present time. There's still a market wide open for more dairy foods sales in this group. Other research studies concern the greater nutritional aspects of ice cream in the daily diet and the possibility of using butterfat for feeding intravenously. These, and others, indicate there are more sales and profits ahead for producers, distributors and dairy equipment suppliers.

"For thirty-five years," stated Mr. Kullman, "the National Dairy Council and its affiliated Dairy Council Units in fifty-four markets from coast to coast, have been telling the nutritious and taste-giving qualities of milk to millions of leaders whose opinions are respected by men, women and children in every walk of life. Increase in milk consumption

"The boss has asked everyone to help keep the office expenses as low as possible this year"

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has been gradual, but continuous, which is fairly reliable evidence that the approach to helping the American public to better understand and appreciate the importance of dairy foods to the health of the nation is a sound one."

The dairy industry has pioneered selling its products the educational way. Its effectiveness as a sales weapon lies in the fact that many large, well-known industrial concerns, as well as smaller ones, are patterning their long-term sales programs along the same lines. Competition for the attention of recognized leaders and authorities throughout the country is developing. This is understandable, for business executives realize that for consumers to stay sold on the merits of a food product, they must first be sold on the reasons for its being good for them.

"There is no other agency that can do as permanent a job of selling dairy foods as the National Dairy Council," declared Mr. Kullman. "Let's get behind its sales education program to build greater security for the dairy business and the 10,000,000 industry people who depend on dairying for a livelihood."

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TEMPERATURE AND PRESSURE

(Continued from Page 10)

Diversion Valve is always in the diverted position.

Another design of the Safety Thermal Limit Recorder uses the two relays in a different arrangement. In the "on" position, the second relay is energized by the first and in turn energizes the solenoid air switch on the Flow Diversion Valve. Air applied to the diaphragm moves the Flow Diversion Valve to the forward flow position and the limit switch is opened. Power to the milk pump starter is supplied through contacts on the second relay. As the Safety Thermal Limit Recorder moves to the "off" position both relays are de-energized. The solenoid air switch is de-energized and the Flow Diversion Valve moves to the diverted position, closing the limit switch. In the de-energized position, the second relay contact are rearranged to provide power to the milk pump starter from the limit switch. If the Flow Diversion Valve fails to operate, the limit switch is not closed therefore the milk pump will stop.

Must Have Adequate Velocity

Good control of the milk temperature is dependent upon sufficient velocity through the water side and a minimum temperature difference between water and milk leaving the heater section.

When the Flow Diversion Valve moves to the diverted position, benefit of the regenerative section of the pasteurizer is temporarily lost, therefore, a greater amount of steam is necessary to raise the temperature than is normally required. Provision is made for this by sizing the steam throttling valve to throttle 20% open when the milk temperture is above legal limit. The remaining 80% travel will permit the flow of three times as much steam to return the temperature above the legal limit.

As exemplified by the short time pasteurizer control, which has been perfected through years of coordinated efforts between the dairy equipment and the instrument manufacturers, the trend of the day is toward more automatic processes. The instrument manufacturer is actively engaged in working on the most effective use of his product for new applications and the development of new designs. In carrying on this activity, he is bound by custom and tradition to strive for greater quality, better performance, and simplicity of design.

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WRITE *for information on the complete SQ Line and for catalog of all Superior Metal Dairyware products.*

SUPERIOR METAL PRODUCTS COMPANY

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BOURDON PRESSURE SPRING

(Continued from Page 12)

and acceptance, until it is used for coiling into pressure springs.

The methods of coiling the Bourdon springs, or any of the other designs, vary with the different instrument companies, but the same degree of careful control of each operation must be used as previously outlined.

The coil diameter, change in tubing cross section dimensions during winding, handling care, stress relief, heat treatment for ferrous springs, bonding the pressure joints, plus many other details must be carefully supervised and inspected to produce the quality pressure responsive instruments of today that will provide many years of accurate service.

The pressure responsive springs, of the Bourdon type using flattened tubing, depend on a change of the minor diameter of the tubing cross section to produce an accurate deflection of the free end in response to changing pressure. This change in the minor diameter is a greater percentage of its zero pressure dimension than the corresponding change in the major diameter. This makes the major bending of the cross section, by changing pressure, come at the relatively small radius curves at the ends of the major axis, in other words this section of the pressure spring is being worked the most. Example: Take an old pressure spring and manually bend it out toward its original straight length, at the same time noting the relatively large increase in the minor diameter of the cross section relative to the decrease in the major diameter. The tubing will kink before it is completely straightened out because the metal in the outside of the coiled spring has been stretched to produce the difference in circumference.

Diameter Related to Sensitivity

The minor diameter is one factor controlling the sensitivity of a Bourdon pressure spring; the sensitivity varying approximately in inverse ratio with small changes in minor diameter dimension. Also the maximum safe operating pressure is changed in the same direction. Coil diameter increase also increases the sensitivity and decreases the maximum safe operating pressure. Increasing the number of coils in a helix will increase the sensitivity but not change the maximum safe operating pressure. Change in tubing wall thickness and/or cross section diamensions also changes the sensitivity and maximum safe operating pressure similar to minor diameter changes.

The foregoing factors, plus others, enter into the designs of the Bourdon type pressure spring for maximum cafe operating pressure, sensitivity, and torque at motion take-off. A pressure responsive spring should be designed to have sufficient torque to move pointer, recorder pen, or control apparatus, or all three, with such degree of sensitivity that no lag or dead zone is apparent, i.e., pen movement should always be proportional to any change in measured pressure.

The Bourdon type single coil spring is usually used in indicators.

The constant diameter multiple coil helix or the increasing diameter multiple coil spiral are usually used in recorders or controllers but actually all three of the foregoing are sometimes found used interchangeably.

Suitable linkage is used between the motion take-off on the pressure spring and a driven lever on the pointer, recorder pen, or controller. Provision is made, in the linkage, for multiplying the pressure spring take-off motion proportional to the angular motion requirement of the driven member, such as pointer, recorder pen, or controller. Calibration is acquired by changing the lengths of the lever arms until the driven member fits the chart or scale.

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PFAUDLER OFFICIAL PASSES

G. F. Kroha, General Sales Manager, Was Active in Dairy Industries Supply Association

George F. Kroha, Vice-President and General Sales Manager of The Pfaudler Co., died Wednesday, August 31, 1949, in the Lakewood Hospital, Cleveland, Ohio. Mr. Kroha suffered a cerebral hemorrhage in returning from a business trip to Dayton, Ohio, on August 20. He was 50 years old.

Mr. Kroha was associated with The Pfaudler Co. since his graduation from the University of Rochester in 1920, beginning in the capacity of Assistant Advertising Manager. He was elected Vice President in Charge of Publicity and Sales Promotion in 1929, and since 1931 has been General Sales Manager of the Company's activities here and abroad. He was also member of the Executive Committee and the Board of Directors.

Mr. Kroha traveled widely for The Pfaudler Co. in all parts of the United States and overseas. He made several round trips of South American and the Caribbean countries, and in July of this year returned from a four months' trip to Great Britain and Continental Europe, spending some time at the Company's plants in Leven, Fife, Scotland and Schwetzingen, Baden, Germany.

During World War II, Mr. Kroha spearheaded the handling of important war programs such as equipment for the manufacture of synthetic rubber, vitamins, Atabrine, blood plasma, sulfanilamide, penicillin, streptomycin, and many others.

Mr. Kroha was a member of the board of directors of The Pfaudler Sales Company of San Francisco, Calif.; of General American-Pfaudler Corporation, Chicago, Ill.; of Enamelled Metal Products Co. (1933) Ltd. of London, England; of the Dairy Industries Supply Association, and of the Beverage Machinery Manufacturers Association, both of Washington, D.C. He was previously a member of the board of directors of the Canning Machinery & Supplies Association of Battle Creek, Mich.

Aside from activities affiliated with his business, Mr. Kroha was a member of the Rotary Club of Rochester, and just concluded a three year term as a member of the board; he was a member of the Rochester Chamber of Commerce, and Vice-President of the Sales Executives Club, connected with the Chamber; he was a recent member of the board of the Civic Music Association; he was a member of The Chemists' Club of New York City, The American Chemical Society, and The Rochester Club.

While in the University of Rochester, Mr. Kroha was an active member of the Musical Clubs, and achieved a local reputation as an accomplished violinist. He was a member of Delta Upsilon Fraternity.

He is survived by his wife, Neva Smy Kroha; a son, Bradford; daughter, Elaine; and his mother, Mrs. Anna Kroha.

●

ARGUE WHOLESALE MILK PRICE

At a meeting held in Milwaukee Sept. 7th two groups were in a deadlock as to the September price for milk at wholesale. They were the dairies and the farmers of southern Wisconsin, and they held their meeting at the offices of the Milwaukee Co-operative Milk Producers, this being the bargaining agency for the farmers of this section.

In discussing the situation, secretary Charles Dineen of the co-op declared that the farmers were endeavoring to obtain an increase in price over the $3.65 per hundred pounds which had been paid for grade A milk during August. The handlers, it was learned, were willing to stick to that price but were not willing to take pay any more. They did not, however, propose a cut in the price. In August the price of grade A milk was cut 2c per quart to 15c to the consumer in the Milwaukee area. The Chicago price, it is said, is about 30c per hundred pounds higher than in Milwaukee. Chicago, according to Dineen, has a federal milk order, which is also being considered by Milwaukee producers.

Chester Dairy Supply Acquires Rights To Jensen Machinery Co.

Pennsylvania Concern To Construct New Factory For Manufacture Well Known Line Formerly Produced By New Jersey Firm

THE JENSEN Machinery Company, Inc. of Bloomfield, New Jersey, announces the sale of manufacturing facilities and manufacturing rights, patents, etc.

General Dairy Equipment, Inc. of Minneapolis, Minnesota, manufacturers of the Vane Churn, the Ovl-Koil Vat, and other specialties, has acquired all patents and manufacturing rights in connection with the Jensen All-Metal Churn and Vertical Coil Vat. They will continue the development and manufacture of these two important items at their Minneapolis plant.

The Chester Dairy Supply Company, Chester, Pa., has arranged for the acquisition of all the manufacturing facilities as well as the production rights, patents, etc., employed by Jensen at their Bloomfield, N. J. plant. Upon completion of detailed planning, Chester Dairy Supply Company will continue the production of the Jensen line of heat exchangers, including the well-known Jensen Fan Cooler, Chilled Water Units, Multitube Heat Exchangers, as well as the line of Jensen atmospheric and vacuum processing vats, Super-Deodorizer, etc.

New modern factory buildings are being constructed at Chester, Pa. to house this production, all of which will be added to the present Chester line of processing equipment.

Mr. F. G. Cornell, Jr., Vice-President of the Jensen Machinery Company, together with other members of the Jensen staff, will join the Chester organization.

It is believed that production in the new Chester plant will begin in November of this year. Meanwhile, Jensen will continue to produce such equipment at Bloomfield.

Organized in California

Ever since the Jensen Machinery Company, Inc., was first formed in 1907 by Aage Jensen at Eureka, California, the name "Jensen" has stood for quality equipment. And, according to Jensen, "it was because of increasingly exacting machinery requirements by processors of dairy products that the company was furnished an opportunity to develop and perfect some of the outstanding machinery of this period;—such as the first Vertical Coil Pasteurizer and Ripener; and improved type Super-Deodorizer; the first All-Metal Churn; the first Vacuum Batch Pasteurizer; a patented "short gas flow" type ammonia evaporator; an industrial Chilled Water Unit capable of reducing the temperature of water to 31°; high-pressure spiral-jacketed pasteurizers with means for removing the product from the vat by air pressure, Full-Floating Heaters-Coolers, etc."

The Chester Dairy Supply Company was organized in 1909, and during its forty years of business existence has developed a line of processing equipment well known to the trade. By the addition of the Jensen line, they can offer a more complete line—backed by many years of expert craftsmanship and engineering experience.

General Dairy Equipment, Inc. was organized in 1937 and has specialized principally in the manufacture of equipment for the production of butter, although several machines also have application for other dairy products.

ROUTINE STHT MAINTENANCE

(Continued from Page 33)

should be checked. (The valve will assume a diverted position if either the electrical power or air supply fails). If the movement of the Flow Diversion Valve is too slow, examination should be made of the air inlet valve mechanism within the solenoid valve.

Failure of Flow Division Valve To Remain in Forward Flow Position

E — Failure of milk in reaching the temperature necessary to permit forward flow or in not remaining substantially constant, thereby causing repeated diversions, may also be traced to air binding of the water circulating system. This in turn can be attributed to there being not enough water in the surge tank to prevent air from entering the suction port of the circulating pump. The remedy is to see that the surge tank is filled, particularly when starting up. Erratic performance can also be traced to air entering the milk stream through improper gasketing of connections in milk pump suction. This can also lead to a discrepancy occurring between indications of the mercurial thermometer and the pen of the Safety Thermal Limit Recorder under certain conditions particularly where the end of the holder tube terminates vertically.

Failure of Milk Pump To Start

F—Failure of milk pump motor to start may be attributed to a blown fuse in the Safety Thermal Limit Recorder. Before replacing fuse, wiring should be checked for defects with assistance of wiring diagram furnished by the manufacturer. (Never attempt making any adjustment other than the one provided for changing the cut-in and cut-out points in this instrument without first making certain the electrical supply is cut off). Milk pump motor may also be prevented from starting by foreign matter such as a gasket lodging between seat and disc of forward flow port, thereby preventing operation of micro switch 45.

Kurly Kate
METAL SPONGES
Designed especially for cleaning all types of dairy equipment and utensils. Will not rust or splinter, cut the hands or injure metal or plated surfaces. Kurly Kate Metal Sponges are fast working, easy to use, and easy to keep clean. Made in STAINLESS STEEL, NICKEL SILVER and BRONZE.
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Send for a trial order
Satisfaction fully guaranteed
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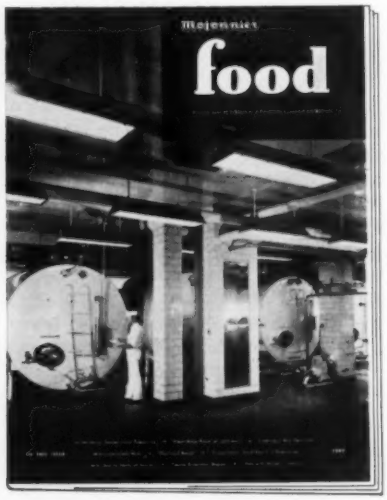
stainless metal sponge
FOR EASIER INDUSTRIAL CLEANING
SOFT ON HANDS
SANITARY
ORDER FROM YOUR JOBBER OR WRITE DIRECT

USING OUR SEPARATOR • ITEMS OF INTEREST SKIMMED FROM HERE AND THERE

New Mojonnier "Food" Ready

CAN WHOLE MILK be concentrated for commercial distribution and still retain all its natural flavor and vitamins when reconstituted? The answer is yes! The facts about this and other major processing advances vitally important to dairymen are contained in this new issue of FOOD magazine, pub-



lished regularly by Mojonnier Bros. Co. of Chicago, as a service to the Dairy Industry. The new number also includes interesting articles about great plant developments of the nation, revealing the latest techniques and applications of dairy equipment. These and technical articles dealing with the latest research data of leading dairy technicians make this issue one you can't afford to miss. There is no charge. Simply write for your copy to Mojonnier Bros. Co., 4601 West Ohio Street, Chicago 44, Illinois.

•

Low Water Cut-off

A NEW low water fuel cut-off for automatically fired boilers carrying up to 50 lbs. pressure has been announced by McDonnell & Miller, Inc. It is known as the No. 63 Low Water Cut-off and while it can be used on steam boilers, it was designed primarily for hot water heating boilers.

The manufacturer explains that the No. 63 Cut-off was developed in keeping with the growing trend toward the application of a device to stop the burner in the event of low water in a hot water boiler which can result from leaks in the system, inoperative primary controls, or the prolonged opening of a relief valve in an emergency. Formerly, the McDonnell No. 150 low water cut-off (for pressures up to 150 lbs.) had been used for this service, hence the development of the new No. 63, for pressures up to 50 lbs., to take care of the pressure range of hot water boilers with attendant economy.

The No. 63 is designed for installation with 1-inch equalizing piping, the method of installation best adapted to hot water boilers. It will also be recommended for automatically fired steam boilers in the middle range of pressures from 20 to 50 lbs., thereby effecting worth-while economies in this broad field of application.

All working parts isolated from heat of float chamber; sylphon bellows, which eliminates packing, is up out of the water; all other working parts are noncorrosive materials. The switch proper is the McDonnell No. 2 Snap action type. Circular containing full details and electrical ratings may be had by writing McDonnell & Miller, Inc., 1409, Wrigley Building, Chicago 11, Ill.

•

Stainless Steel Filters

THE Amplex Manufacturing Company, powder metallurgy division of Chrysler Corporation, is now equipped for quantity production of permanent Oilite stainless steel filters suited to food and chemical industry use.

Typical shapes of filters produced by the Chrysler subsidiary include discs, sheets, plain cylinders, and cones. Special shapes are built to fit customers' product designs.

Porosity or permeability, which may range from nearly zero to more than 60 per cent depending upon the application, is closely controlled.

Made from the stainless steel powders, the Oilite units provide depth filtration. Material passing through one of them must follow a tortuous route — through a maze of minute connecting passageways which run in all directions. They are easily flushed.

Filters are not brittle or friable, according to the manufacturer.

•

Answer to Steam Costs

THE unnecessary cost of steam can often be turned into a profit says James Leffel & Co.

Leffel Bulletin No. 236 fully illustrates and describes the details of Leffel Scotch Boilers — the boiler that has been the favorite and more widely used in the Dairy Industry over a longer period of time than any other because it is built and adapted for the exacting service of all kinds of milk handling plants.

•

Continuous Packet Blowdown

THE Henszey Packet Type Continuous Blowdown automatically and continuously removes impurities from the boiler, and it also saves the heat by transferring it from the blowdown water to the incoming feedwater, according to the manufacturer.

This unit is particularly designed for small plants of under 500 boiler horsepower. Completely automatic, it gives a definite and correct blowdown regardless

of variation in boiler load. It permits an accurate control of concentration such as is usually obtainable in large plants.

An automatic control is set to establish the amount of continuous blowdown in proportion to the quantity of make-up water and its impurities. This control then regulates the amount of blowdown for variations in the amount of make-up water added to the boiler system. The heat from the blowdown water is returned to the boiler by means of the Henszey Heat Exchanger

The Henszey Packet Blowdown is self-contained and arrives at the point of installation, assembled and ready to operate. Controls, thermometer, heat exchanger, and supports are all in one crate.

•

Electric Milk Cooler

A NEW, SMALL-SIZE electric milk cooler to serve farms which have fewer than ten cows in their dairy herds, or to cool cream at larger dairies has been announced by the Westinghouse Electric Corporation. Its suggested retail price is $210.

This new milk cooler (Model S2-7A), called the Cooleret, has room for either three five-gallon or two ten-gallon cans of milk or cream, and can cool them from 90 degrees down to 50 degrees in one hour.

XUM

The milk cooler cabinet is of standard big-cooler construction. It is made of heavy-gauge galvanized steel, well-insulated and equipped with an hermetically-sealed refrigeration unit and a motor-driven water circulator.

●

Tumblers for Cottage Cheese

IN RESPONSE to the growing popularity of cottage cheese as a healthful, economical and non-fattening food as well as to the preference of homemakers for glass as the favored package, the Owens-Illinois Glass Company is now offering a complete line of nationally advertised Libbey tumblers for cottage cheese and sour cream, according to an announcement by R. B. Wilhelm, Manager, Dairy Container Division.

Dairies which use glass profit from the strong consumer trend toward visibility in packaging evidenced in the tremendous surge to transparent packaging in all lines of goods, Mr Wilhelm pointed out. Well known features of the Libbey line, he said, include: Unconditional Safedge guarantee against chipping, consistent high quality, a container which has high re-use value in the home, a nationally advertised product bearing a recognized and respected name, a container which serves as a reminder of the product and a package which invites continued purchases "to collect a set".

Used by many dairies because of their attractive appearance and low cost are the shell-type tumblers with Applied Color decorations. These tumblers come in a variety of sizes and shapes and offer a wide choice of decorative designs. The Applied Colors used to decorate these tumblers is made from a ceramic paint which is fused to the glass. As a result the tumblers will stand repeated washing in the home without fading or loss of color.

Another tumbler type which has been rapidly increasing in popularity is the spray frosted glass with which almost any color may be used. As in the ACL designs, a ceramic paint is used for spray frosting, providing an attractive and permanent decoration.

A recent development in the cottage cheese field is the use of attractive, heavy-base tumblers, the same type as used with the nationally advertised Libbey Hostess sets. These tumblers have met with ready acceptance wherever they have been introduced. Quality glassware of this type possesses instant appeal for the homemaker, since it is suitable for use with the finest silverware and linens.

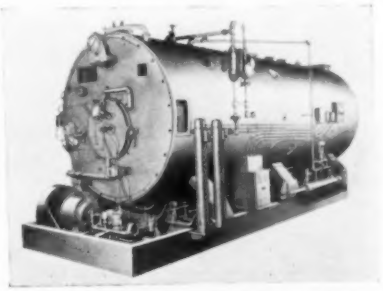
Libbey tumblers sold by Owens-Illinois are made for various types of covers, including Standard Cap and Seal, Sterling and various aluminum covers. In addition, Owens-Illinois packaging experts can supply dairymen with complete closure and filling information to fit their particular needs, Mr. Wilhelm said.

●

READ JIM KLUGER'S ACCOUNTING COLUMN BEGINNING IN NOVEMBER AMERICAN MILK REIVEW

400 H. P. Steam Generator

AMES IRON WORKS, Oswego, New York, makers of automatic self-contained steam generators have developed a new 400 H. P. Amesteam Generator. This new generator is automatic and said to be economical to operate. It is built for pressures from 15 to 200 lbs., for operation with oil or gas. In areas where both oil and gas are available, or seasonal costs vary, oil-gas combination burners are available.



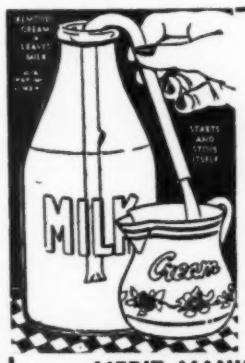
The new 400 H. P. Amesteam Generator is furnished complete, ready for installation on customer's boiler room floor. When connected to steam, water, fuel and electric lines, breeching or stack, it is ready for operation. Foundation required is a level floor of sufficient thickness to carry the load.

Furnaces and tubes are arranged for the flow of hot gases over all heating surfaces. A high rate of heat transfer, a low exit gas temperature, with consequent speed up water circulation is claimed. As a result, commercially dry steam at operating pressure can be produced from a cold start in 20 to 30 minutes – merely by pushing the starting button.

●

Paint for Asphalt Shingles

"ASPHALT-SEAL", a waterproof finish for painting and weatherproofing asphalt side wall and roof shingles, is now being marketed by its originators DEWATEX MANUFAC-



AN EFFECTIVE BUSINESS BUILDER
A Useful X'mas Gift
MAGIC CREAM SIPHONS for home use, remove cream from bottled milk to use with coffee, cereals and desserts.
PLEASE OLD CUSTOMERS — WIN NEW ONES
Leading dairy firms find Magic Cream Siphons a welcome sale booster aid. Homes using a cream siphon consume more milk when they learn how many foods are improved by the liberal use of milk instead of water in preparing.
Free sample for round or square bottles
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Complete Satisfaction Guaranteed
MERIT MANUFACTURING COMPANY
3455 EAST 150TH STREET CLEVELAND 20, OHIO

TURING CORPORATION, 42nd Street and Dyer Ave., New York 18, New York.

Developed for use to restore and beautify dirty, weatherbeaten insulated brick siding, the manufacturer claims this new product stops bleeding and crumbling, by sealing the pores of the surface, leaving a colorful waterproof finish which will withstand atmospheric and weather conditions.

Available in one and five gallon containers this finish is ready mixed for immediate application and comes in three light and four dark colors.

●

Ice Cuber and Crusher

WITH A FLIP of the switch on the front, this machine, called the York Automatic Ice Maker, makes

available a supply of pure cube ice or equally pure, uniformly crushed ice, without trays, at point of use.

Flame Failure Safeguards

THE SHORTAGES of gas and oil in various localities over the past several years have resulted in a trend in the direction of combination gas-oil burners on industrial installations. Most installations burn heavy grades of oil as the principal fuel and gas as the stand-by fuel, or burn gas as the principal fuel and lighter grades of oil as the stand-by fuel.

Fireye announces the availability of Flame Failure Safeguards and Programming Systems to take care of either combination with complete safety and with a minimum of electrical and mechanical adjustment when changing from the principal fuel to the stand-by fuel.

With heavy oil as the main fuel and gas as a stand-by fuel, Fireye System FF-2 is used. This consists of Photoelectric Scanner Type 45PH5, Flame Rod Type 45JPI and the Programming Control Type 24PJ8. When the system is used on heavy oil, the Electronic Rod monitors the gas pilot flame, preventing the main fuel valve from opening until flame is established. The Photoelectric Scanner monitors the main oil flame turning off the entire system in case of flame failure. The programming Control automatically starts the burner in operation and programs the sequence of oil valve delay, post-ignition timing and priming period.

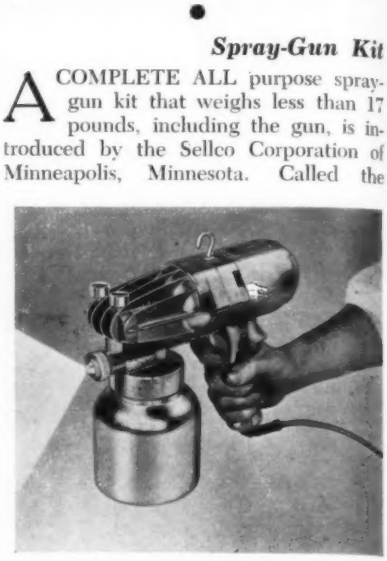
When the installation is converted to gas, the electronic rod monitors the continuous gas pilot flame and the programming control programs fuel and ignition systems. A simple switching means is all that is required for the change-over from oil to gas.

With gas as the main fuel and light oil as the stand-by fuel, Fireye System FF-6 is used. This system includes Electronic Rod Type 24JQ1 and Control Type 24QJ5. With either gas or oil as a fuel the Electronic Rod monitors the continuous gas pilot, providing through the Control instantaneous safety shutdown of the main flame on pilot flame failure. Monitoring operations on gas and light oil are identical and no wiring changes are required on changeover.

●

Spray-Gun Kit

A COMPLETE ALL purpose spray-gun kit that weighs less than 17 pounds, including the gun, is introduced by the Sellco Corporation of Minneapolis, Minnesota. Called the



Payswell Spray-pak, it is a complete, portable spray kit for the farmer, dairyman, repair-maintenance man, painter or household handyman.

The Payswell Spray-gun itself will spray one quart of any sprayable liquid in four minutes at over 50 pounds of air pressure. Compressor, motor and gun are all in one unit.

The price of the Payswell Spray-gun is $59.95. The complete Spray-pak with gun and all accessories is $79.95 at all hardware and paint dealers. For further information write to Sellco Corporation, Dept. A-10, 801 Andrus Building, Minneapolis 2, Minnesota.

●

Booklet on Spray Cleaning

HOW A FAST-ACTING, mechanized hot-spray cleaning technique helps speed food plant equipment clean-up tasks, and cuts costs as well, is discussed in an illustrated

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Urner-Barry Company, Publishers

92 Warren Street New York 7, N. Y.

booklet just published by Oakite Products, Inc., New York.

Booklet tells how this manufacturer's specially-engineered hot-spray units provide efficient 3-way cleaning action that combines heat, pressure and detergent action to make short work of many plant and equipment cleaning operations. These hot-spray units, the manufacturers report, are capable of spraying hot, dirt-loosening detergent solutions through special gun nozzles over wide areas at a constant 30 lbs. pressure. Dirt, grease, fats, etc., are hit by approximately 1¾ gallons of solution per minute delivered by these units, it is said. Mounted on casters, units have easy portability which permits them to be wheeled wherever needed around the plant.

Among the advantages claimed for mechanized hot-spray cleaning for booklet lists the following: (1) It frees maintenance and clean-up personnel for other duties by eliminating excessive brushing, scraping and chipping operations; (2) It enables production supervisors to return equipment to regular-run operation sooner; (3) It substantially cuts the costs of cleaning procedures; (4) It does away with the disagreeable and tedious aspects of maintenance cleaning; and (5) The thorough cleaning action supplied helps prolong the useful life of processing and handling equipment.

Readers desiring free copies of this booklet for additional information concerning hot-spray cleaning and its many applications in food plants, should address Oakite Products, Inc., 31A Thames St., New York 6, N. Y.

●

Pre-Packaged Orange Concentrate

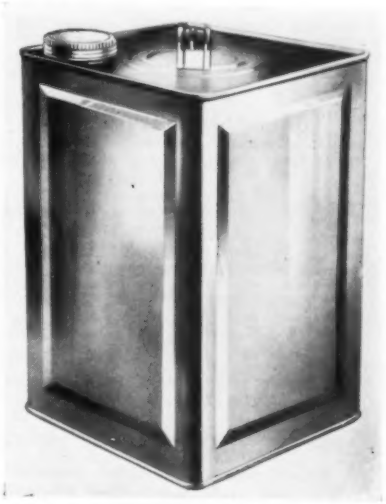
A PRE-PACKAGED Orange Concentrate with sugar added is now being offered to dairies by the Eze-Orange Company, of Chicago, who have long been a leader in the dairy fruit drink field.

This new product is completely manufactured by the Chicago company. Packed 12 quarts to the case, it is shipped to dairies—bottled, labeled, and ready to put on their trucks and sell. Packaged in a quart bottle, with label showing ripe oranges in color, and specially decorated cap.

●

New Can for Milk

A NEW TYPE of can in which fresh whole milk may be stored has been introduced by the Stern Can Company of 183 Orleans Street, East Boston, Massachusets. This can, which holds five gallons, is square in shape, making it easy to store compactly



in limited space on board ships, trains and planes. Can may be thrown away once it has been used. The United States Navy, Merchant Marine and Coast Guard have been using these five-gallon Stern cans successfully since the war, according to the manufacturer.

REVIEW *Want Ads PAY!*

NDC TO MEET IN CHICAGO

Annual Winter Gathering Slated For La Salle Hotel January 26 and 27 — Good Program Outlined

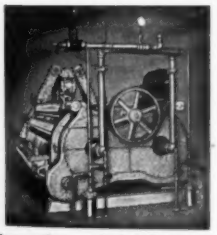
THE 1950 ANNUAL Meeting-Winter Conference of the National Dairy Council will be held in Chicago at the La Salle Hotel on January 26 and 27, it was announced recently by Milton Hult, NDC, President and General Chairman of the two-day event.

Prior to these sessions, a special one-day meeting on January 25 is being set up for the benefit of directors in the 53 dairy council markets. For this occasion the National Dairy Council is developing a program to acquaint Dairy Council executive members and their staffs with new materials and to provide opportunities for exchange of ideas which proved successful in promoting increased consumption of dairy foods.

With a theme that highlights NDC's 35 years of service to the dairy industry, the Program Committee is in the midst of plans which call for down-to-earth discussions on dairy problems concerning production, packaging, marketing, sales, economic trends in the dairy business. In addition, several sections of the program will deal with the general business outlook for 1950, and how dairy foods research stimulates new business.

The entire program will be keyed to the needs of the industry. The thinking of outstanding dairy industry leaders and trade association secretaries, obtained through a survey, is being incorporated in the program plans. To guide the Program Committee, an industry advisory group, composed of members from the NDC Board of Directors, is cooperating in shaping plans for the 35th Annual Meeting. This group consists of E. J. Davidson, Wilson & Company, Chicago; Carl A. Wood, Cherry-Burrell Corporation, Chicago; and O. R. Thompson, Rib Lake Dairy Co-op., Medford, Wis.

Better DRY MILK AT LOWER COST



DRY MILK MACHINES
Built in Five Sizes

The Patented, glass-smooth, "20-year cylinders" give years and years of maximum production of a superior dry milk at the lowest possible cost.

Many other exclusive features insure long life with low steam and power costs. Complete details upon request.

OVERTON MACHINE COMPANY
DOWAGIAC MICHIGAN

You are Invited to Compare

Quality First **Forbes CHOCOLATE**

with any other brand for

QUALITY TASTE FRESHNESS
SMOOTHNESS MILDNESS

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25c additional in the United States.
50c additional in Foreign Countries.

When replying to any of the following keyed advertisements please address replies to:

BOX NO. ..... AMERICAN MILK REVIEW
92 WARREN STREET NEW YORK 7, N. Y.

(The deadline for Classified Advertising is the 10th of the month preceding publication.)

No classified advertising will be accepted to run with borders or special spacing. All such advertisements are considered "Display" advertising and will be billed at regular display advertising rates. (Rates and mechanical requirements on request.)

FOR SALE — EQUIPMENT

FOR SALE — 100 gallon Pfaudler Glass Lined Lo-Vat very nice condition with thermometers $675.00. 100 gallon Purity Pasteurizer welded Stainless Steel lining and covers, excellent condition $450.00. 200 gallon Kaestner all welded Stainless Steel lining, covers and jacket rectangular pasteurizer with thermometers fine condition. A bargain at $850.00. 200 gallon Cherry-Burrell spray pasteurizer all welded Stainless Steel lining, covers and jacket with thermometers and temperature control on heating medium, this pasteurizer is about eight years old and had excellent care, is priced to sell. 200 gallon Cherry-Burrell pasteurizer, same as above but without Stainless Steel jacket. This machine only two years old and is in perfect condition. With thermometers and temperature control on heating medium this vat is a bargain at $1,000.00. E-19 DeLaval Separator excellent condition Stainless Steel disc, used very little, $175.00. Type J Milwaukee Filler with all new gears and shafts, very nice condition, $150.00. 50 gallon Manton-Gaulin Homo with Stainless Steel head with single phase, 110-220 volt 60 cycle motor perfect condition $625.00. 10 hp 1947-100 lbs. working pressure A.S.M.E. Code Cyclotherm Boiler with automatic water feed and oil pressure controls, user stopped processing, boiler only used part of 1947. One 6-18 Cherry-Burrell Filler with extra Kleen Kap Capper, excellent condition $700.00. Cherry-Burrell Ladd three space bottle filler, three horse single phase motor, very good condition $400.00. One 200 and one 300 gallon C-gal Pfaudler pasteurizers with thermometers. One six-F Cherry-Burrell Filter, good as new. One 4 ft. 1"-24 tube surface milk cooler with tinned copper covers. 3 x 3 Self contained York Compressor with 5 hp 3 phase, 60 cycle motor. 30 hp Scotch Marine 100 lbs. w.p. with oil burner also grates. One 8 hp and one 6 hp Dutton Verticle boilers. R. G. Wright Co. 200 gallon pasteurizer Stainless Steel welded lining. Model C. C. Cherry-Burrell 200 gallon pasteurizer Stainless Steel lining. Write Orrest H. Beau, 17 Carlile Ave., Utica, N. Y. 10-M

FOR SALE — One 2,000 gallon Cherry-Burrell holding tank. One 600 lb. stainless steel (new) scale weight vat. One 600 lb. stainless steel drop vat match for scales. One pair Toledo scales, 500 lbs. capacity. One 15 hp gas fired boiler (used 18 months). One 4-6 can Straight Away Damrow can washer (used 12 months). One 5 x 5 York ice machine. One Cherry-Burrell plate cooler, 1,000 lbs. per hour (used 12 months). Write Morrison Brothers, Box 158, Greensboro, Alabama. 10-M-2

FOR SALE — EQUIPMENT

FOR SALE — Trucks & Equipment. Divco trucks, U.L.M. 4 models, 100 quart case capacity. 1 Damrow 6 C.P.M. straightway can washer Type 6BP. 2000 used quart wood milk bottle cases. 1 Vilter Ice Packer, 6 ton capacity, purchased 6/15/48. Write for particulars and prices; above guaranteed in first class condition. Shoemaker Dairies, Inc., Bridgeton, New Jersey. 10-M

FOR SALE — One 9 case retail wagon cabinet insulated for square bottle cases. Outside dimensions 14" wide, 48" high, 42" long. Original cost $100.00. Best offer takes same. Write Box 229, care this publication. 10-M

SPECIAL OFFERINGS — 200 and 400 gallon Stainless Steel Insulated Tanks; 2000 and 3000 gallon Pfaudler Glass Lined Storage Tanks for by-products only; 600 to 1000 gallon Rectangular Shaped Stainless Steel Vats, 2 ft. deep, no covers; 1000 gallon Cherry-Burrell Horizontal Coil Vats, S.S. Linings and Tinned Copper Coils; 6000 lb. Kaestner Internal Tubular Heater; 100 to 300 gallon Stainless Steel Pasteurizers; Rice & Adams Straightaway Can Washer, 6 to 8 c.p.m. Lester Kehoe Machinery Corporation, 1 East 42nd Street, New York 17, N. Y. 10-M

FOR SALE — 1 Cherry-Burrell Stainless Steel 20 valve nu-line filler. 1-12 can per minute Wright & McKinley 1942 straightaway can washer. Elmhurst Cream Co., Inc., 154—21 South Road, Jamaica 4, N. Y. 10-M-t.f.

FOR SALE — Boilers; Erie Economic 80 H.P. with smoke stack; 50 H.P. Vertical recently re-tubed. Reply Schuette Bros., Breese, Illinois. 10-M-2

FOR SALE — At our Warehouse and Shop we have a good selection of Pasteurizers, Coolers, Bottle Washers, Bottle Fillers, Can Washers, Storage Tanks, Heaters, Separators, Weigh Cans, Fillers, Ice Cream Freezers, Homogenizers, Vacuum Pans, Pumps, etc. Save money by considering good Used and Reconditioned Equipment. Write or wire your requirements. Lester Kehoe Machinery Corporation, 1 East 42nd Street, New York 17, N. Y. Telephone MUrray Hill 2-4616. 10-M

FOR SALE — One Meyer 8 wide bottle washer. Completely rebuilt by Meyer Engineer. ½ pints to quarts, round or square bottles. $4,000.00 F.O.B. Jacksonville. Write C. T. Kirkman, 2648 College Street, Jacksonville 4, Fla. 10-M

FOR SALE — Mojonnier stainless steel, 12 spout Vacuum Filler and Capper, reconditioned and guaranteed; Model 90RH for one-half pints, pints, quarts and one-half gallons. Will handle up to 90 bottles per minute. Complete with vacuum pump; inlet and outlet conveyor with stands and stainless steel covers, and stainless steel accumulating table with separate drive. PRICED LOW. Also Cheese Vats, Sanitary Fittings and Sanitary Pumps. Write The Filter Paper Company, 2460 S. Michigan Ave., Chicago 16, Illinois. 10-M

FOR SALE — Pure-Pak machine, Jr. Model B, good operating condition, 35 bottles per minute capacity, available for immediate sale, best offer takes it. Call or write J. Young, Capitol Dairy Company, 4326 S. Wabash Ave., Chicago, Illinois. 10-M

FOR SALE — MISCELLANEOUS

REBUILT — Pasteurizers, Milk Coolers, Bottle Fillers, Ice Machines, Plate Coolers and Heaters, Homogenizers and Bottle Washers. Send us your requirements. Ohio Creamery Supply Company, 701 Woodland Ave., Cleveland 15, Ohio. 10-M-t.f.

FOR SALE — Truck lettering and trade mark decals, made for your truck and store advertising. Easy to apply; uniform, distinctive, economical for small or large needs. Write for catalog. Mathews Co., 827 So. Harvey, Oak Park, Illinois. 10-M-6

BUSINESS OPPORTUNITY

FOR SALE — Milk and Ice Cream plant fully equipped, all new equipment about two years old, in A-1 condition. Two routes, three trucks in all, 600 quarts daily. This could be increased to 2,000 quarts daily without making any additional changes as plant is equipped to handle that with no difficulty. Ice Cream, Soda Fountain and milk bar in front of plant. For further information, write Earl's Dairy Products, 228 N. Scott Street, Wilmington, Delaware. 10-M

WANTED — Experienced retail milk delivery man who is able to fill an opening to relieve three men on routes, and two in the dairy. He must be a good route builder, take care of complaints and lagging collections. Only men with good references and experience need apply. This is a permanent job with good salary, and possibilities for advancement to foreman. Location, Central New Jersey. Write Box 223, care this publication. 10-M-2

FOR SALE — In Wisconsin college town, Milk & Ice Cream plant, 6 retail milk routes, one Ice Cream route; Dairy Bar at plant, good buildings & equipment; most of it new last two years; 5 trucks '47 & '49 models; room for expansion; excellent reputation, a well kept up plant, in and outside; some terms can be arranged. Price $52,000 for everything, will sell without buildings for $35,000 plus $175.00 per month rent on 5 year lease. Reply Box 217, care this publication. 9-M

Independent operator of several dairy businesses will purchase substantial well established dairy with successful earnings record. Will furnish capital to acquire interest of one desiring to retire or to effect consolidation with another company to increase volume and profits, with retention of present key personnel. Am not a broker. All information held strictly confidential. Satisfactory if contact made through third party. Write Box 226, care this publication. 10-M-3

FOR SALE — Complete operating dairy business; grade A milking barns, 100 cow capacity; coolers, pasteurizers, delivery trucks complete to handle twice present capacity; five good established milk routes, also processing for other producers. For sale at approximately annual gross income; in a prosperous suburban area of St. Louis; Business expanding, money maker; illness, reason for selling. Write DULANEY* BURCHFIEL, Hotel Jefferson, St. Louis, Mo. 10-M

MISCELLANEOUS

FOR SALE — Divco Floor Mats $7.25 per set, f.o.b. Buffalo. Satisfaction guaranteed, state year, Iroquois Mat Co., Swan Street, Buffalo 10, N. Y. 10-M-2

FOR SALE—Orange-Ade Base made from fresh oranges. Nothing to add but water, $1.35 per No. 10 tin. Bradway Chocolate Company, New Castle, Indiana. 10-M-t.f.

COAL — Pennsylvania, West Virginia and Ohio. Carload Coal Corp., 55 West 42nd St., New York 18, N. Y. 10-M-t.f.

FOR SALE — Chocolate Powder and Chocolate Syrup for making Non-Settling Chocolate Milk. Your trial order will receive our prompt attention. Bradway Chocolate Company, New Castle, Indiana. 10-M-t.f.

FOR SALE — Country plant in Pennsylvania — approved for New Jersey and Newark. For particulars write Box 220, care this publication. 10-M-3

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THERMOMETERS — We repair Mercurial Indicating Thermometers, dial thermometers and recording thermometers of all makes. Instruments are reconditioned like new. Satisfaction guaranteed. For economical savings ship your thermometers to Nurnberg Thermometer Co., 124 Livingston St., Brooklyn, New York. 10-M-t.f.

HELP WANTED

WANTED — College graduate in dairy processing, preferably one with plant experience, interested in selling. Can offer attractive future. Write Box 228, care this publication. 10-M-2

WANTED TO BUY

WANTED — A good used Viscolizer or homogenizer. Give size, make, price and condition in first letter. Write Box 227, care this publication. 10-M

POSITION WANTED

WANTED — Ice Cream and dairy accountant, capable executive, familiar with regulations within industry, diversified experiences, enviable record of performance, seeking opportunity within organization where talents can be fully utilized. Interesting salary, excellent reference. Write Box 224, care this publication. 10-M

FOREIGN POSITION WANTED—Dairy Industry Student will graduate from well known State Agricultural Institute seeking foreign employment in dairy industry. Have had experience. Traveled extensively. Open to complete investigation. Write Box 230, care this publication. 10-M

SPECIAL SERVICE

MR. MILK HANDLER — Do You Need Help In Preparing: weekly bills, monthly statements, farmers checks — All Monthly Reports, Experienced Auditors. Write for details, Box 155, care this publication. 10-M

OF EVENTS TO COME

International Dairy Exposition, Inc. — First annual International Dairy Exposition, including exhibits of dairy cattle, dairy equipment, and dairy product processors will be held October 8 to 15, 1949, at the State Fair Grounds, Indianapolis, Ind. Secretary, Robert D. Hammer, Room 633, 130 E. Washington St., Indianapolis, Ind.

Wisconsin Buttermakers and Managers Association—Annual convention to be held at Chippewa Falls, Wis., October 11 and 12. Elmer Radtke, Reedsburg, Wis., executive secretary.

Iowa Creameries Association, Iowa Creamery Operators Association, Iowa Milk Driers Association—Annual conventions will be held at Hotel Savery, Des Moines, Iowa, October 20 to 22. Information from Dr. A. W. Rudnick, Iowa State College, Ames, Iowa and John S. Quist, Executive Secretary, 224 N. Russell Ave., Ames, Iowa.

International Association of Milk and Food Sanitarians, Inc.—Thirty-sixth annual convention will be held at the Deschler-Wallick Hotel, Columbus, Ohio, October 20 to 22. Secretary, George A. West, 44 Marshall St., Rochester 2, N. Y.

Milk Industry Foundation — Annual convention will be held at the Ambassador Hotel, Los Angeles, Calif., October 24 to 26. Executive director, B. F. Castle, 1001 Fifteenth St. N. W., Washington 5, D. C.

International Association of Ice Cream Manufacturers—Annual convention will be held at Biltmore Hotel, Los Angeles, Calif., October 26 to 28. Executive Secretary, Robert C. Hibben, 1105 Barr Building, Washington 6, D. C.

Dairy Industries Supply Association—Stand-by headquarters Alexandria Hotel, Los Angeles, Calif., October 24 to 29. Executive director, Roberts Everett, Albee Building, 14th and G Streets, Washington, D. C.

American Public Health Association—Seventy-seventh annual meeting will be held at the Hotels Statler and New Yorker, New York City, October 24-28. Executive secretary, Dr. Reginald M. Atwater, 1790 Broadway, New York City.

New York State Milk Distributors, Inc.—Annual convention will be held at the Mark Twain Hotel, Elmira, N. Y., November 9 and 10. Executive secretary, J. Russel Fox, 74 Chapel St., Albany 7, N. Y.

Dairy Technology Alumni, University of Illinois—Second reunion will be held November 19 at the dairy building, University of Illinois. Executive secretary, Dr. P. H. Tracy, Dairy Manufacturers Bldg., University of Illinois, Urbana.

Dairy Industries Society, International—Third annual meeting has been scheduled to be held in Washington, D. C., during the last week in November. Chairman, Board of Directors, Robert Rosenbaum, 1426 G. St. N.W., Washington, D. C.

Western States Dairy Conference — Annual convention will be held December 1-2-3, at the Cosmopolitan Hotel, Denver, Colorado. Reservations and information may be obtained from Ammon Bradshaw, Colo. Dairy Products Assn., 415 C of C Bldg., Denver 2, Colo.

Wisconsin Milk Dealers' Association — Annual convention will be held at the Schroeder Hotel in Milwaukee, December 6-8. Secretary, Harry Klueter, 1 W. Main St., Madison, Wis.

Illinois Dairy Products Association — Annual convention will be held at the Morrison Hotel, Chicago, Ill., December 12 to 14. Secretary, M. G. Van Buskirk, 309 W. Jackson Blvd., Chicago 6, Ill.

Minnesota Milk Council—Annual convention will be held at the Duluth Hotel, Duluth, Minn., November 28-30. Secretary, Dan T. Carlson, Willmar, Minn.

Colorado Dairy Products Association, Inc.—Annual convention and Western States Dairy Conference will be held at the Cosmopolitan Hotel, Denver, Col., December 1 to 3. Executive Secretary, Ammon Bradshaw, 415 Chamber of Commerce Bldg., Denver 2, Colo.

Kansas Ice Cream and Milk Institute—Annual convention will be held at the Jayhawk Hotel, Topeka, Kans., December 5 and 6. Secretary, Dale M. Bryant, 1004 Brown Bldg., Wichita, Kans.

Nebraska Milk Dealers Association—Third annual convention will be held at the Hotel Paxton, Omaha, Neb., December 8 and 9. Secretary, Robert W. McGinnis, 845 Nye Ave., Fremont, Neb.

Illinois Dairy Products Association—Annual convention will be held at the Morrison Hotel, Chicago, Ill., December 12 to 14. Secretary, M. G. Van Buskirk, 309 W. Jackson Blvd., Chicago 6, Ill.

Louisiana Dairy Products Association—Annual convention will be held at the Jung Hotel, New Orleans, La., January 8 to 10. Secretary, Lewis Torrance, The Borden Co., Baton Rouge, La.

North Carolina Dairy Products Association — Annual convention will be held at the Hotel Sir Walter, Raleigh, N. C., January 12 and 13. Executive Vice-President, L. L. Ray, P. O. Box 2687, Raleigh, N. C.

Indiana Dairy Products Association — Annual convention will be held at the Claypool Hotel in Indianapolis, Ind., January 16 to 18. Secretary, R. A. Larson, 623-24 Board of Trade Bldg., Indianapolis 4, Ind.

Alabama Dairy Products Association — Annual meeting will be held January 20 and 21, at the Jefferson Davis Hotel, Montgomery, Ala. Secretary, Prof. A. D. Burke, Box 509 Auburn, Ala.

Georgia Dairy Association—Fourteenth annual convention will be held at the General Oglethorpe Hotel, Savannah, Ga., January 26 and 27. Executive director, James E. Jackson, 414 Hurt Bldg., Atlanta, Ga.

Michigan Allied Dairy Association—Sixty-sixth annual convention will be held at the Hotel Pantlind, Grand Rapids, Mich., February 14-16. Secretary, L. N. Francke, 2010 Olds Tower Bldg., Lansing, Mich.

Pennsylvania Association of Milk Dealers — Eighteenth annual convention will be held at the Penn-Harris Hotel, Harrisburg, February 20 and 21. Executive vice-president, Benj. G. Eynon, 324 Telegraph Bldg., Harrisburg.

West Virginia Dairy Products Association—Annual convention will be held at the Greenbrier, White Sulphur Springs, W. Va., August 7 and 8. Secretary, Prof. S. J. Weese, Dairy Department, University of West Virginia, Morgantown.

Southeastern Wisconsin Cheese Association — Twentieth annual convention will be held at Beaver Dam, Wis., November 15 to 16. Secretary, D. J. Horn, Beaver Dam, Wis.

Ohio Animal Nutrition Conference—Will be held at Ohio State University, Columbus, Ohio, November 10 to 11. Information from L. K. Bear, 206 Plumb Hall, Ohio State University, Columbus, Ohio.

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Opens Vaccine Lab in Mexico

Officials of Mexico and the United States today joined with Mexican President Miguel Aleman in the dedication of a new vaccine production laboratory recently completed at Palo Alto, a suburb of Mexico City. It will be used by the Mexican-United States Commission for the Eradication of Foot-and-Mouth Disease in its fight against the animal plague.

Dr. P. V. Cardon, Research Administrator for the Department, represented Secretary of Agriculture Charles F. Brannan at the ceremonies. Prominent in the program were Lic. Oscar Flores of Mexico, director of the Joint Commission, and General Harry Johnson of the United States, co-director. President Aleman laid the last stone in the building as the highlight of the dedication.

Dr. Cardon praised the accomplishments of the Commission, but pointed out the long and arduous task still ahead in "starving out the virus." He said: "As the technicians of the Commission take up the task in these excellent surroundings, they become a part of a never-ending pattern in which science is pitted against the evils and ills that beset mankind. I know that Mexico is proud, as we are in the United States, to be a part of that pattern as we dedicate this laboratory today. At the same time, we re-dedicate ourselves to the job of wiping out foot-and-mouth disease in Mexico. We will not lose sight of that goal."

Major work of the new laboratory will be the manufacture of vaccine required to carry on the current program. It will be necessary to produce from 100,000 to 200,000 doses a day to continue the repeated vaccinations of all susceptible animals in the quarantine zone. The first round of vaccinations was completed about the first of August, covering over 13,000,000 cattle, sheep, goats, and swine. In addition to the production of vaccine, the laboratory will provide facilities for other special chemical studies and tests aimed at obtaining more practical knowledge about vaccine production.

The Palo Alto Laboratory will give Commission employees adequate facilities for identifying and typing viruses. The lack of such facilities previously has been a hindrance in carrying out the eradication program, particularly in distinguishing vesicular stomatitis, a much less serious virus disease in which the symptoms are the same as in foot-and-mouth disease.

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September 1949 Release

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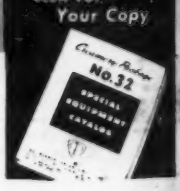
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